

TECHNOLOGY



approach

vol 5
11

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MAY 1960

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TECHNOLOGY
DEPARTMENT



An aircraft sometimes encounters hail in clear air several miles from the nearest thunderstorm. In a study limited to 103 in-flight hail encounters, 20% of the hail encountered above 20,000 feet was found in clear air, beneath the anvil cloud or other overhanging clouds of the storm. Clear-air hail is also occasionally encountered between cumulonimbus towers, usually below 25,000 feet; apparently it is undetectable by the aircraft radar.—*Flight Safety Foundation, Inc.*

IF YOU CAN'T GO OVER, UNDER OR AROUND, GO HOME



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APPROACH

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most
flyers
approach
is required
reading

**...NOT
NOW**

LETTERS

Force Limits

Sir:
APPROACH of Feb 1960 article "Jam Up" page 44, states that the 6-foot 2-inch, 200 pounder could not budge the controls.

According to BuAer Instruction 3750.7 dated 6 Nov 1959, he should not have tried to budge them regardless of his size.

VANCE G. MOORE, AD2

Argentina

● You're so right. Please see "Don't Fight It," page 14.

'Pooped Pilots,' Too

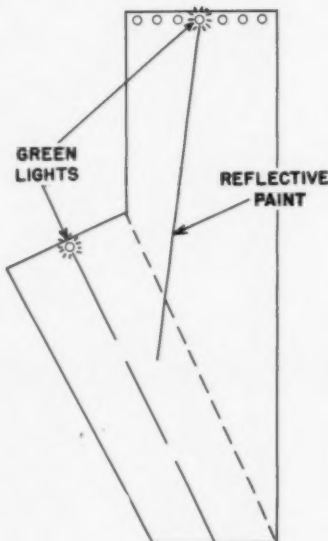
Sir:
Concerning the response to "Pooped Pilots" in Nov. APPROACH, I for one go along with Anymouse. The reference in the original Anymouse letter is to crews that operate with two pilots and one or two non-pilot navigators. In my squadron, 7 of the 14 crews are in this position and believe me tragedy is lurking in such a lash-up. I hope no lives are lost before someone closes the barn door. Higher intensity scheduling can solve this problem and still meet operational commitments.

DITTO

Line-up Aid

Sir:
Our line-up for night deck launches during recent carquals was aided greatly by a reflective painted line and a green light. Normally the line-up is made on the third white light inboard from the starboard deck edge. A hairy takeoff was made one night due to some of

the lights being out. The third light inboard was replaced with a green light and the launch line was extended to the bow. The green light gives positive line-up point for the night deck launches. A green light was also placed on the forward part



of the angle deck to aid in night angle deck launches.

AVIATION SAFETY OFFICER

AirASron 37

● Several special projects are currently underway to improve carrier lighting for safer night flying. More on this is scheduled for a future APPROACH — but ideas are welcomed.

Ejection Points

Sir:
At the risk of the chance of being called a "two-ejection expert," the following thoughts regarding a very real problem associated with low level ejection are submitted. The trend of today is to the low level ejection system in almost all jet airplanes. This system has been sorely needed for some time and the capability of bidding the "beast" adios at or near ground level is a welcome one, but don't die from over-exposure to false security.

The flight manual for one Navy airplane incorporating a low level ejection seat includes the statement: "At ground level, safe ejection will be accomplished as long as the airspeed at the time of ejection initiation is 75 knots or greater." This data has been confirmed during sled test ejections of instrumented dummies. This writer was not "instrumented"; however, he has recently been released from three months hospitalization required to recover from a "safe ejection" from this specific airplane. The following remarks are associated with the pilot's ejection since the passenger ejected some 2-3 seconds earlier, at a slightly higher altitude and airspeed and was not injured.

When ejection was initiated, the airplane attitude was wings level in about a 10-degree climb; airspeed was about 125 knots and altitude was between 50 and 75 feet. Almost immediately after ejection, the airplane struck the ground in a nearly level attitude causing a fireball-like flame to ascend above the point of initial impact. During the pilot's trajectory from point of ejection to his point of impact, and as the parachute was being deployed, he traveled through the fireball, sustaining second degree burns. The existing wind was inadequate to appreciably influence the movement of the fireball.

VOLUME 5

APPROACH—THE NAVAL AVIATION SAFETY REVIEW

NUMBER 11

Purposes and Policies: APPROACH is published monthly by the U.S. Naval Aviation Safety Center and is distributed to naval aeronautical organizations on the basis of 1 copy per 12 persons. It presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders, or directives. Material extracted from Aircraft Accident Reports (OpNavs 3750-1 and 3750-10), Medical Officer's Reports (OpNav 3750-8) and Anymouse (anonymous) Reports may not be construed as incriminating under Art 31, UCMJ. Photos: Official Navy or as credited.

Non-naval activities are requested to contact NASC prior to reprinting APPROACH material.

Correspondence: Contributions are welcome as are comments and criticisms. Views expressed in guest-written articles are not necessarily those of NASC. Requests for distribution changes should be directed to NASC, NAS Norfolk 11, Va., Att: Literature Dep't.

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Nearly half of the parachute canopy was consumed by the flames (see photo (2)) allowing the pilot to strike the ground at a high rate of descent which caused Class C injury.

The lesson to be learned is now quite obvious; but such a problem had not been realized heretofore. When faced with a low level ejection during a flameout approach, it appears that the only reasonable solution is to eject from the airplane at an altitude sufficient to insure that the airplane will cover adequate horizontal distance, prior to striking the ground, to insure the pilot a flame-and-wreckage-free path of trajectory. This "magic altitude" will vary with such things as existing airplane gross weight, glide ratio . . . ; however, this writer has adopted 200 feet as the altitude at which he will decide that he has the field made or the time has come to "go."



Of interest to this writer was the very noticeable decrease in airspeed from about 135 to 125 knots caused by an increase in drag when the passenger ejected from the rear seat. The reaction force of the seat initiator firing caused an increase in angle of attack resulting in an increase in induced drag. The seat and passenger momentarily acting as a "speed brake" just prior to the seat leaving the airplane and canopy rupture are some additional drag producing items that could cause this phenomenon. The point, of course, being that it should be anticipated when a low level ejection is imminent as the increase in drag will reduce the horizontal distance the airplane will travel prior to striking the ground.

P. O. HARWELL, CDR
Head, Fighter Branch
Service Test Division

NATC, Patuxent River

P.S. I have just examined the ejection envelope diagrams for the A3J and am afraid the same problems are going to exist for that aircraft.

Feedback

FROM time to time, as members of the Naval Aviation Safety Center staff visit various units and air stations, they hear of particular APPROACH features which may have contributed to preventing an accident, stimulated thinking on a common potential emergency, or just added to that some-day-it-will-be-needed store of info every professional aviator seeks.

If and when something in the magazine does this, that's fine—it's what we're here for. But it does help greatly in planning future issues to hear that such and such an item was particularly useful, and why.

So how about letting us have your comments and criticisms.

Rescue Charts for Plane Guardians

Sir:

I am writing because of something that I found out today. I was instructing men from a plane guard destroyer that operates with us—men that man the whaleboats and the swimmers that pull pilots and crewmen out of planes that are sinking. They say they know very little about how to pull a pilot out of an airplane or the proper way to get into one. Upon showing them crash crew charts, the ones that show how to get into an aircraft in an emergency, they told me they would like to have some to keep around and learn. I propose that plane guard destroyer people be sent these crash crew charts for reference, they may prove to be very worthwhile. . . .

H. D. V., AM2

VA-192, FPO, San Francisco

● The U.S. Navy Aircraft Fire Fighting and Rescue Manual (NAVAER 00-80R-14) might be helpful to you. It can be ordered from Commanding Officer, Bldg. 334-1, NAS North Island, San Diego 35, Calif. (Pacific Fleet units) or from Commanding Officer, AERO PUB Bldg. SP-50, NAS Norfolk, Norfolk 11, Va. (Atlantic Fleet units). However, from our records, the possibility of a plane

guard destroyer boat crew reaching a carrier type aircraft crashed or ditched at sea before it sinks is remote. Personnel pick-ups from the water are the rule.

For the Record

Sir:

Your article, Influence of the RCVG's on Accident Prevention," page 14, Jan 1960 APPROACH, was excellent *but!*

Only too often in the recent past have APPROACH and other publications failed to give proper recognition (and respect) to the workhorse of the fleet, the grand and glorious "ABLE DOG."

For information purposes both VA-44 and VA-42 are supplying the Atlantic Fleet with AD replacement pilots who, I am sure have contributed substantially to the safety record attained by RCVG trained pilots.

We demand an apology for the omission of the AD in the article and further demand proper recognition be given to Able Dog pilots.

ABLE DOG

VA-44

● Sorry—No intent to ignore or fail to recognize AD contributions —Intent was to note improvement in the jets which have been major accident contributors.

Want 'Copter Bailout Ideas

Sir:

With the advent of IFR flight clearances for helicopters necessitating higher altitude operations and possibility of IFR conditions precluding a safe autorotation to the ground, a re-evaluation of helicopter parachute procedures is believed necessary, with emphasis being placed upon the ability of the pilot and copilot to bail out of a HSS in normal autorotation (heading into the wind, 60 knots IAS).

How about an article stimulating and soliciting comments and recommendations concerning helicopter bailout procedures?

V. C. BROWER, LTJG
Survival Officer

FPO NY, NY

● While we naturally favor carrying a chute in choppers because we feel everyone is entitled to an alternate means of escape we recognize this is not always operationally feasible. Your comments are invited.

Your aircraft
was
built for
many
missions
—don't use
it
all up on
one.



This one-in-a-million photo clearly illustrates compression wrinkles as they occur on the upper surface of aircraft airfoils during high positive G maneuvers. The picture is highly unusual in that a combination of several factors was necessary: a high G pull-up, light rays striking the upper surface of the wing at a low angle, and, of course, the shutter of the camera open at the exact second the first two conditions were satisfied. The aircraft shown is not exclusively susceptible to this phenomenon.

WINGS



FATIGUE—what is it?

It depends on what you're talking about—machines, like airplanes, or the human machines who fly them. We're concerned about both of them, and we can apply many basic observations about fatigue to both, but let's see more clearly the fatigue problem we're talking about—fatigue of aircraft structures.

The term "fatigue" as used in reference to aircraft structures is borrowed from a much older application, for fatigue in people has been known, recognized, studied and treated for many years—even though we still don't have an accurate yardstick to measure its extent. Fatigue, according to Mr. Webster, is to "waste away" . . . weariness from labor or exertion . . . exhaustion of strength . . .

But in distinguishing "people fatigue" from "machine fatigue," Webster says, ". . . loss of power due to continued work, *but removable by rest* . . ."—that certainly applies to you and your crew; however the mechanical definition tells us that it's ". . . the action . . . causing deterioration and failure after a repetition of stress . . . it is probably (sic) due to the accumulation of a large number of very small permanent sets."

Say you're somewhat tired after many hours in the seat, you're fatigued, but you can still fly 'er—and suddenly you lose your port engine, your ARC27, your letdown plate . . . and your ability to hack the emergency. CRACK!—you're overstressed. The emergency load which you could have handled under no-fatigue conditions is too much when it's heaped on top of your fatigue.

Same thing happens to your airplane. Its main spar and other major structural members get

"somewhat tired" after repeated applications of over-the-limit g-loads. It's weak, it's tired, it's FATIGUED, and its actual load limit is now lower—but you don't know it, and so it fails at some lesser load than the max. permissible.

If your personal fatigue accumulates and stays accumulated, like money in the bank, eventually you will fail. But, you rest before reaching that fail point and your accumulation of fatigue goes back to zero (or somewhere near) before it starts all over again.

Now, how about that spar or other main member on your high-speed one-man transport? It too accumulates fatigue—of a different sort, but from the same cause, too much work. BUT—here's the big difference: The structure doesn't get to go back to zero! Instead, it piles up little bundles of fatigue, doesn't complain a bit, doesn't get grouchy or snap at the kids after a hard day of excessive "g" pullouts, but goes right on doing a job until one day it just plain "gives up"—and there you are, hoping all the shoot-seat pins were pulled.

In a relatively short span of time—when you consider how long man has been trying to build a better mousetrap, the airplane has evolved from a very crude, unpredictable machine to a very complex (and still not fully predictable) one. As continued new uses for aircraft became apparent, they were exposed to extremely rapid development until today, just a little more than half a century after the beginning, we're concerned about how to reduce frictional airspeed heating in the high, bitter cold regions of the upper atmosphere. The continued need to increase the performance of the airplane at all altitudes and speeds has forced the

engineer to monitor his design more closely so that these demands for better performance can be met.

One means available to the designer for increasing performance is to increase thrust of engines and decrease the weight of the aircraft. To do this he must eliminate all superfluous materials, use stronger materials and generally be more aware of any superficial structure that can be removed and still maintain the basic integrity of the aircraft. The engineer has been able to do this in that he has produced a high performance vehicle which, if operated within the designed flight regime can be considered as one of the best weapons presently employed by mankind.

One factor over which the designer has no control is the operator of the aircraft. The designer establishes certain limits on his product and assumes that these are considered by the operator. Unless the limits are adhered to, the aircraft will be damaged and may be lost to service. Therefore, it is imperative that pilots know the established limits and abide by them.

The operational limits with which we are concerned here are those involving structural strength. Each aircraft has an established set of load limits which are considered adequate for the performance of its mission. However, to allow adequate control of the aircraft throughout its operating range, it is necessary to have control movements of such magnitude that in high speed regimes it is possible to overcontrol and exceed the aircraft's structural strength. The best way to control the structural forces exerted on the aircraft is to teach the pilot the forces involved and train him to control his aircraft in such a manner that he can get the most out of it operationally without damaging it structurally.

The penalty for ignoring structural limitations can be pretty serious—structural damage rendering the aircraft unusable for further service. Or it can be mighty serious—total disintegration of the aircraft and loss of the pilot. In some cases a weakened structure may not be evident, but will show itself later when a failure occurs at a much lower load. Thus the airframe may fail on a flight other than the one on which the damage was incurred.

'G'

The limit loads or the G-limit of an aircraft is often thought of in rather narrow terms such as a "3-G aircraft" or a "7-G aircraft." Seldom is the concept broadened to consider the other problems involved concerning forces encountered during every day flying such as aircraft weight, rolling maneuvers while in a high G condition, gust loads and loads imposed by external stores. Each

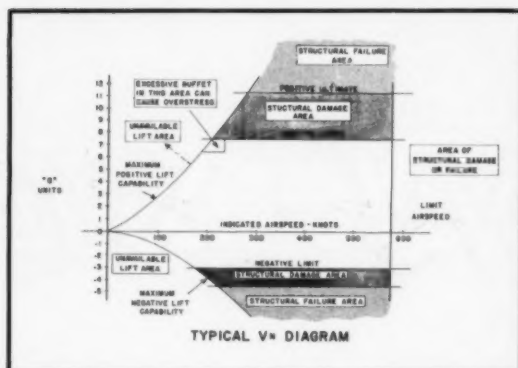


Figure 1

of these items has a definite effect on the aircraft's structural limitations.

Vn Diagram

The basic source of pilot information concerning the maneuvering forces allowable in any particular aircraft is the Vn diagram (see figure 1). The basic Vn diagram usually indicates the symmetrical forces allowable under certain weight, altitude and speed conditions. Variations or interpolations of this diagram are necessary if conditions other than those established for the basic Vn diagram exist, i.e. changes in weight, altitude, weight distribution, . . . Each change in configuration must be considered and the allowable acceleration should be computed prior to undertaking any flight which will include high G maneuvers.

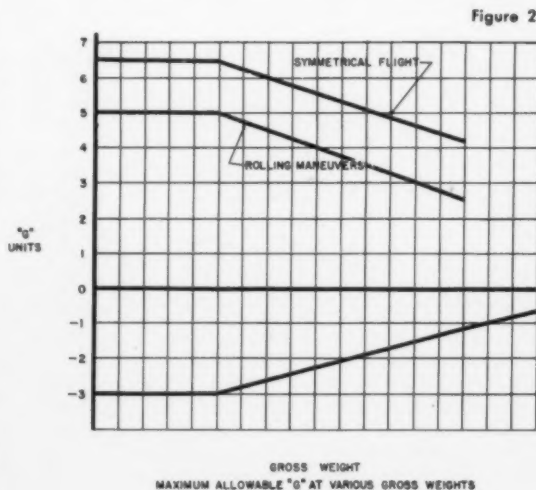


Figure 2

Weight

The basic Vn diagram is established for a certain gross weight of the aircraft. If the gross weight is in excess of that stipulated for the basic Vn diagram, the forces on the aircraft will actually exceed structural limits. The lift to support the excess weight is greater than normally would be needed and the forces on the wing structure are above allowable limits. Figure 2 shows the relationship between weight and G allowable for a standard fighter.

To avoid exceeding the limit load, the gross weight for any airplane configuration must be computed prior to the initiation of any high G-maneuver. As can be seen from figure 2, as the gross weight is increased the limiting G is lowered.

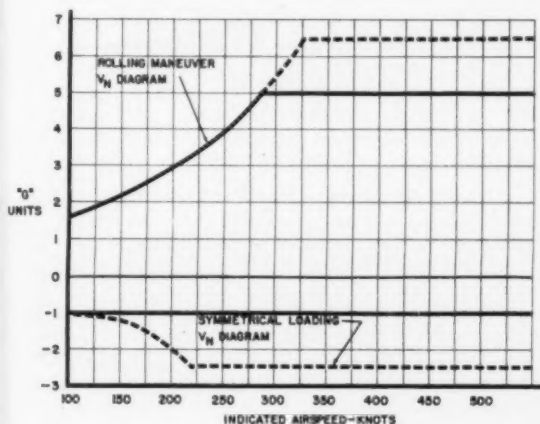


Figure 3

Rolling Maneuvers

If a rolling movement is induced during a high G-maneuver the distribution of the forces over the aircraft no longer remain equal. The torsional forces put on the wing by the application of the flight controls plus the uneven lift distribution may cause the forces on the wing to be greater than those for which it was designed. Usually the aircraft is designed to withstand only 80 percent limit load when the load is combined with a maximum roll rate maneuver (see figure 3). Therefore, for all practical purposes the basic Vn diagram is shrunk and is no longer applicable in its entirety under the above conditions.

Special Phenomena

There are several phenomena that are not always controllable by the pilot and which can contribute to structural overstress; however, if he is aware of these he can make compensations to allow for them.

Gust Loading—Turbulence occurs at all altitudes throughout the atmosphere in varying degrees. Occasionally, and especially at the lower altitudes, its severity is such that combined with normal flight loads experienced during some maneuvers it can cause an overshoot, that is, an excessive number of G's. For example if a 6-G pullout is being performed and a 2-G gust is encountered, the result will be a force of 8-G on the aircraft. To stay within the structural limitations of say, a 6.5-G aircraft, the pilot must compensate by decreasing his intended G-loading when gust loads are expected.

One factor to consider is that the loading may not be of sufficient duration to be recorded on the accelerometer. The accelerometers installed in Navy aircraft will record only relatively long duration forces and may not indicate the actual forces encountered. Information concerning gust severity can be obtained from the local meteorology office.

Stick Force Per G—Some aircraft are designed so that as the longitudinal control is displaced and G's are put on the aircraft, the increase in stick forces does not increase at a steady rate as G's increase. As an example, it may take 10 pounds force to go from 1 G to 4-G but only 2 more pounds to go from 4 to 6-G. If the pilot is not aware of this he may continue to exert the same amount of pull as he approaches the allowable G-limits and easily overshoot the limit.

Buffeting—At various points throughout the flight regime of an aircraft it is impossible to attain sufficient lift on the wings to sustain a high G-loading. The aircraft will stall before the desired G-force can be reached and buffeting of the aircraft will usually result.

If the stall and buffeting take place near the maximum allowable G-limit or if buffeting is allowed to become severe, it can cause structural damage to the aircraft. If the aircraft is flown to the buffet but not into it, within the allowable G-limits, no damage will occur (see figure 1).

Design Limitations

Every Navy aircraft is designed to meet certain limiting specifications. One of these is the incorporation of specific G-tolerances into the airframe to allow certain maneuvering loads commensurate with its mission.

As a safety factor, the basic aircraft structure is designed in such a manner that it will withstand

an "ultimate load" of 1.5 times the design limit load without failing. The purpose of this safety factor is to provide enough reserve strength in the aircraft to allow it to fulfill a useful service life and to compensate for human error. It was *not* put into the aircraft to be used indiscriminately or supposedly to increase its combat capability. Like the judge says, the traffic police allow you a few MPH above the posted speed limit before they nab you to allow for human and speedometer error. But, if you use that "safety factor" as a bonus, you'll hear a siren sooner or later.

The aircraft operated by the Navy are considered to have adequate strength to carry them through a normal useful service life. This service life usually varies between 2000 and 10,000 flight hours and is computed on past usage of other aircraft. Future Navy combat capability is computed on the assumption that most of these aircraft will complete their service life as set forth in the original specification. However, if the aircraft is not operated within the design limits, it may become damaged sufficiently to cause its early retirement from service. One way that this can occur is through aircraft structural fatigue.

Structural Fatigue

Navy aircraft are designed to withstand an ultimate load of 1.5 times the design limit load to provide an adequate service life and to compensate for an occasional human error. The operational G-limits set forth for each aircraft are established to prevent not only ultimate structural failure but

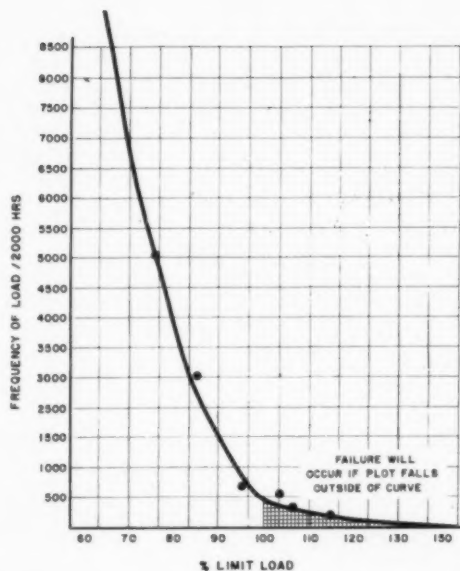


Figure 4

to prevent excessive stresses which cause metal fatigue.

All metal, when loaded beyond a certain point, tends to yield. It may come back to its original shape or nearly so and any distortion may be imperceptible. On the other hand, if the excessive loads are reapplied a sufficient number of times the metal will ultimately fail. This can be adequately demonstrated with a paper clip or any bendable piece of metal.

Aircraft structures are affected in the same manner. If the aircraft is loaded excessively, i.e., somewhere between the limit load and the ultimate failure point, a sufficient number of times, a failure will take place. The diagram in Figure 4 indicates what one standard fighter will take in the way of excessive loads. As can be seen, provisions have been made to cover what should be the normal G levels encountered. However, if excessive G is incurred too often the pilot falls outside the curve and a failure results.

The most difficult fact to determine is the time of ultimate failure. As the structure becomes fatigued, its strength decreases and the final failure may occur at a much lower G-loading than limit load. The lessening in strength is not necessarily reflected in structural damage which can be readily detected. The only reasonable method of preventing this type of failure is to fly within the established load limits.



Lt. O. E. (Jerry) Covington prepared this article for *APPROACH* while he was Airframes Officer in the Maintenance & Material Department of NASC. Lt. Covington has flown Sanjox with VA-12 and ADs with VA-55; he also served a tour as an exchange pilot with the Air Force, flying the F-86D with the 94th Fighter Interceptor Squadron. He is presently attending the School of Naval Science, Monterey.

The most logical method of preventing excessive G-loads is to plan the loads to be incurred prior to launch.

Prior to any weapons delivery, lead, initial starting point of the weapons run and release altitude are all computed to insure the best possible results. However, in conjunction with these computations, care should also be taken to compute the G-loadings which will be involved. This should include aircraft weight at the time of the high G-maneuver. It should also include the G-forces necessary to complete the recovery from the maneuver in the allotted altitude. These G-forces should be such that an adequate cushion is available to allow for overshooting the intended G. If some compensation is not made for the variations in forces encountered, an overshoot of the load limit will invariably occur.

If the planned G-load very closely approaches the limiting G, any error on the part of the pilot can result in an overstressed aircraft. When attempts are made to perform maneuvers to a predetermined acceleration, there will be a dispersion of actual accelerations attained above and below the intended acceleration. This dispersion about the intended value would appear very similar to the familiar probability distribution curve. The amount of deviation above or below the intended acceleration is a function of many variables pre-

viously mentioned plus pilot technique. Therefore, rather than chance an overstress by planning the G-loading too near the limit, the G-loading should be planned to allow for the errors which can be anticipated and in this manner prevent overstressing the aircraft.

A major factor to keep in mind when operating your aircraft in training is that this same aircraft may have to perform satisfactorily in combat. If it is abused during the training cycle, the possible damage may prevent the aircraft from performing adequately in combat. The method in which aircraft are destroyed is immaterial to a potential enemy. If the wings are pulled off by the pilot, this accomplishes the same thing as a shell or missile.

In the heat of combat the pilot will be depending on his past training to keep him out of trouble. If he has been trained to consider the various ramifications involved when performing certain maneuvers, he will automatically honor the limitations he has used in practice. If, on the other side, he has fallen into the habit of ignoring the limits he will continue to do so and accomplish the enemy's purpose without any help.

It is the responsibility of each pilot to know and abide by the limitations of his aircraft and thereby preserve himself and his aircraft for the task intended. ●

How Is Your Squadron's Torquing?

IMPROPER torquing procedures are accounting directly or indirectly for more than their fair share of our accident rate. Is your outfit up to snuff on torquing procedures? A study was completed recently on failures of aircraft component parts and it was discovered that a large percentage are caused by improper torquing of threaded fittings. This of course can be prevented by *supervision and education*. Utilizing pertinent technical publications and complying with *correct* procedures cannot be overemphasized where lives and large sums of money are concerned.

Presented here are some of the errors of torquing uncovered by the study:

Many times, fasteners that have been over-torqued have then been "backed-off" and re-torqued to the proper values.

Motor-driven impact wrenches with capacities higher than the desired torque values have been used in preliminary tightening.

Many torque handles are misused as hammers, crowbars and door stops. Others are not thoroughly inspected and recalibrated after they have been dropped or banged about.

Some forgot to inspect torque handles periodically and calibrate them in accordance with pertinent tech publications. And too often, they are not readily available to maintenance personnel.

A common error is failure to lubricate before insertion and there have been numerous cases of fittings being installed with damaged threads and other defects.

Wrenches other than torque handles have been frequently used to torque threaded fasteners that have assigned torque values.

Extensions are sometimes used on the drive ends of torque handles. This gives a false reading.

Many shops have incomplete technical pubs or the pubs are not readily available to the workers.

Clevises have been fitted by overtorquing of the clevis bolt, rather than by proper fitting of the clevis parts.

These are only some of the possible discrepancies your squadron may suffer if close supervision and periodic inspections are neglected. The proper use of these handy-dandy little tools will go a long way in preventing service failures of aircraft components.

M N I T R

Complete Briefings

The chairman directed that all COs and Ass't Flight Training officers stress the importance of complete briefings before and during flights. When one does not comply with standing operating doctrines, *safety* is being *overlooked*. Enough time should be allowed before flights so that briefings are completed properly. —*Accident Prevention Board, Minneapolis*

NC-5 Parking

All squadrons were advised to review their S.O.P. concerning the parking of the NC-5 adjacent to aircraft. The NC-5 should always be parked parallel to the aircraft being started and wheels chocks should be in place during starting. All NC-5 starting units will have chocks secured to them for easy availability and to prevent loss. —*ComFAirWing 6.*

Can Can


Reported that a crewman on the transient line had almost serviced an Air Force aircraft with the wrong type oil. Petroleum Base 1010 and synthetic Base 7808C Turbine Engine Oil come in identical cans except for identifying data printed on the sides of the cans. Servicing personnel must read the label on each can before use. —*NATechTraCom*

Information Please

It is the policy to require more info on FUR reports. Additional information makes it an AMPFUR. It was pointed out that all information that will aid in screening and repairing will be added even though it makes it an AMPFUR. —*ComFAirHawaii*

"No Gyro" Approach

Tactical units expressed opposition to the GCA phrase "Disregard your gyro." Chairman pointed out that certain AAR recommendations had been submitted to CNO relative to change in terminology. When the term "Disregard your gyro" is given, reference is being made to the directional instrument only. Units were requested to impress upon their pilots that no GCA controller will ever instruct them to disregard their attitude gyro. Liaison between chairman and station airfield operations officer produced a local change in GCA terminology. For transition to a "no gyro" approach, the words "Disregard . . . compass" will be used. It is understood that a change to OpNavInst re GCA terminology is pending—*3rd MAW*



EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS
THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP
AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Flight Lunch Poisoning

Brunswick experienced several cases of food poisoning among airborne flight crews. The difficulty was traced to flight personnel waiting excessive lengths of time prior to consuming box lunches. A second source believed to have precipitated the food poisoning was chocolate milk issued as part of the lunches. Chocolate milk has been removed from the box lunches until the return of cooler weather.—*Brunswick Sub-Area*

Everybody a Winner

VP-40 Safety Officer described a program for inducing aircrewmembers to inspect the condition of their survival gear by rotating a colored CO₂ bottle in mae vests. An appropriate prize is awarded each day to the individual who finds a colored bottle.—*ComFAir and ComNABs Philippines*

Safety Pins

The emergency canopy release safety pin and the ejection seat safety pin have been tied together by a common line in all FJ-3 aircraft. This will insure the removal of both pins by the pilot.—*NAS, Willow Grove.*

Movie Technique

The Aviation Safety Officer of VQ-1 reported that duty personnel are now stationed adjacent to the duty runway during all training flights for the purpose of monitoring and taking motion pictures of all landings. Debriefings are then held with the pilots involved with the aim of perfecting pilot technique in landing the various types of aircraft assigned to the squadron.—*FAirWing-6.*

Wheel/Tire Handling

Maintenance officers were directed to reemphasize to all their personnel the inherent danger of removing and disassembling wheels with tires inflated.—*1st MAW*

P.C. Responsibility

The maintenance safety officer pointed out that P.C. can stand for Plane Commander or Plane Captain. Pilots who land ashore with or without crewmen are responsible for proper securing of their aircraft, i.e., tie-downs, gust locks, jury struts, and for the proper preflighting, i.e., clean windshields, clean oleos, draining of sumps and strainers and insuring that oil and gas caps are secure. Naturally when men are available to do the actual work the problem is simplified but the pilot is never relieved of the responsibility.—*VS-21 Safety Committee*



SHORT STORY

ON a round robin nav training flight, the pilot of a TV-2 filed for a 15-minute passenger stop at a "P" field with ANG facilities. This field was located less than 200 miles from home base. After a weather briefing (the entire area was CAVU) the NOTAM file was checked and no pertinent ones were found.

Arriving at his destination after a routine flight, the pilot delayed entering the traffic pattern until reaching landing weight. When he was ready to land, contact with the tower was made and at this time he was informed that the jet instrument runway, 7000 feet long, was closed due to construction.

A choice of the other two runways 5000 feet in length was offered.

Considering that he was familiar with the field and that he had landed the TV-2 successfully on other 5000-foot strips, the pilot elected to shoot an approach, advising the tower he might possibly waveoff. In an effort to land as slow and as short as possible, the approach was made slightly wide, slowing to 115 knots on final. Late in the approach, power was eased off and the jet settled into soft ground some 20 feet short of the runway. As it rolled forward onto the runway the starboard wheel and lower strut snapped off. The landing "roll"

resulted in a 2300-foot gradual swerve to the right. There was no fire and no injury to the pilots.

People in the know will spot a CNO violation (jet flight operations from a civil field). Had normal clearance procedures been followed the passenger stop would not have been allowed. These errors are not without importance but two other factors in the accident will be given more attention as they are frequent contributors to accidents and "hairy tales."

Why, when the pilot was considered capable of operating into a 5000-foot runway, did he undershoot? Weather conditions do not have a bearing in the

case; a light crosswind without any turbulence existed at the time of landing. Weight and airspeed do have a bearing however. At touchdown there were 480 gallons of fuel aboard. With this gross weight (estimated 13,400 pounds), a speed of 115 knots is at the critical stall speed and when power was eased off, the only way to go was down. This "premature" power reduction, as the accident board called it, was the final factor which dropped the airplane short of the runway.

A safe landing could have been made using 120 knots (basic speed of 105 knots plus 5 knots for every 100 gallons of fuel in excess of 200). The flight manual also indicates a landing and safe stop could be made within 3500 feet.

Once he had arrived over the field the pilot elected to land. He said afterwards, "Had I known that the long runway was closed. . . I probably would have not filed for that field."

Immediately after notification of the accident, the board sought to determine why there was not a NOTAM concerning the construction in progress. They found that a NOTAM had been in effect for some time previously but had been cancelled (and thus it would be removed from the files) by a message which stated the NOTAM would be published in the Enroute Supplement dated the 7th of the month. The effective date of that issue was the 22nd and was received on the 21st, three days after the accident.

How or why the NOTAM system failed here is of less concern than how to overcome possible similar instances in the future when flying to civil airports or joint military-civil fields. One endorsement to the accident report discusses the problem and the remedy: "It is believed that pilots and operations depart-

ment personnel are relying solely on the NOTAM file customarily maintained in Naval and Marine Corps Air Station operations departments for NOTAM information which, even though properly maintained, will not provide all required information when filing to civil airfields or military airfields designed for joint use.

"Of particular concern . . . is the apparent failure of flight personnel to utilize the *Airman's Guide* for flight planning purposes since the inception of the new and revised military flight publications. The *Airman's Guide* contains an excellent listing of current NOTAMs regarding civil fields and military fields regularly utilized by civil agencies.

"In this case, the NOTAM regarding closing . . . the runway was initially published (one month before the accident) and carried in all subsequent editions of the *Airman's Guide*." Accordingly, the following recommendations are made:

"That all pilots and operations department personnel be briefed or rebriefed on the contents of

the *Airman's Guide* publication.

"That all pilots be instructed to check for current NOTAMs in the *Airman's Guide* when filing to civil airfields or military airfields designed for joint use . . ."

● The Hydrographic Office purchases sufficient *Airman's Guides* for air station flight planning rooms but Hydro is unable to distribute to squadrons. The *Airman's Guide* can be purchased with Bravo funds. Individuals can order a personal subscription—it's a possibility that it would be allowed as an income tax deduction.

OVER AND OUT—After one arrested landing and one bolter, an A4D-1 was trapped a second time and then taxied forward toward the starboard catapult. Flaps were left full down in adherence to SOP that no change in the external configuration be made without a signal from the flight deck directors or catapult officer.

A *Cougar* was on the catapult and a *Skyhawk* was aligned with the cat, holding immediately be-



The A4D was no match for the combined effects of a crosswind and jet blast.

hind the blast deflector. The A4D which was being taxied forward was brought behind the holding *Skyhawk* and was headed 30 degrees to the right of the ship's centerline.

"There were no wingwalkers," the pilot said, "and the plane director had directed his attention elsewhere. As I sat parked, the left wing began to lift. I attempted to counter this tendency by the application of left aileron and by a turn to the left. This was to no avail as the weight had been lifted from the port wheel and no braking traction was available." Fuel load at this time was 2000 pounds and wind over the deck was 250 degrees, 36 to 38 knots.

The plane director noticed the wing lifting off the deck and was busy signaling the *Skyhawk* parked just behind the catapult to reduce power to idle.

This reduction of jet blast failed to help the teetering A4D. Its wing continued to rise and it slowly started to rotate around the right main mount. When the left wing had risen to approximately 20 degrees above the horizontal, the airplane suddenly flipped on its back. As the canopy was broken the pilot dismounted from his fallen steed through the hole. He was not injured but experienced some difficulty in disconnecting the lap belt rocket release fittings.

The combined effect of the jet blast from the *Skyhawk* ahead

and the crosswind was considered the prime factor in producing the accident. Other A4D pilots had noticed a definite tendency for the port wing to rise on each occasion not taxiing athwartships during this qualification period.

To prevent further accidents of this nature the carrier adopted the following procedures:

- Wingwalkers are used on all A4D aircraft whenever crosswind taxiing is involved or whenever an A4D must be turned downwind for spotting purposes. Because of the safety factor involved in night operations, crosswind taxiing or downwind turns are avoided whenever possible. When necessary, however, the tempo of operations must, of necessity, slow down for reasons of safety. (For economy reasons also! The accident board recommended that due to extensive structural damage this aircraft be stricken and sent to salvage. —Ed.)

- Aircraft are not taxied out of the arresting gear until the flaps are UP. On launching, the flaps are not lowered until the aircraft is on the catapult.

- All A4D aircraft are spotted clear of jet exhaust from other aircraft. All plane directors have been instructed to be on the alert for any pilot using excessive power while on deck in the vicinity of A4D aircraft. To further eliminate the jet blast hazards,

A4D aircraft are not mixed with other models during carrier qualifications.

- All aviation fueling personnel have been thoroughly briefed on the hazards involved in unequal fuel distribution.

- In addition, periodic briefings on the hazards of operating A4D aircraft on deck are conducted by the flight deck officer for all plane directors.

RAINY DAY SOP—Two F4Ds were cleared to commence a Tacan penetration from the 30-mile holding fix and were further cleared to shift to a preset GCA channel. They were cruising on top in the world of bright sunlight and dazzling white cloud tops. On the ground the world presented a somewhat different picture—a sodden, dismal picture: —X5 ① E15 ② 30 ⊕ 1 RF 5 Visibility ¾ SE.

"Go channel 14," the leader called to his wingman.

"Roger," came the acknowledgment.

However the wingman was unable to come up on the GCA channel and he was unable to manually dial it in. At this time the two "Fords" entered the soup so no further attempts were made to establish interplane communications as a channel shift while in clouds was not considered advisable.

On GCA final the flight met

DON'T FIGHT IT

"IF your flight controls ever feel jammed as you run the checklist item: "controls; freedom and direction of movement"—don't try to free them by muscle power.

BuWeps notes numerous cases where jammed flight

controls were freed by excessive pressure before an inspection could be made. Subsequently, the causes for the jammed condition could not be found.

All pilots finding the controls jammed or restricted while the aircraft is on the

ground shall make no effort to free the controls by force on the controls. Hold light pressure against the restriction and call for an immediate inspection. The Maintenance Officer will take it from there in accordance with BuAer Instruction 3750.7.

heavy rain. Due to the windshield design of the F4D (or lack of—Ed.), there is no forward visibility during flight through rain. Upon approaching the runway the leader was lined up to the left and took a waveoff. The wingman, flying on the right, made a slight right turn for alignment and continued on in for a landing.

Touchdown was near 150 knots, 1500 feet from the threshold. The pilot experienced difficulty in maintaining alignment due to a lack of forward visibility and the rain-slick runway.

After a goodly portion of the hard surface was used up the F4D started skidding. Being somewhat in the dark as to runway lineup and distance to go the pilot decided to extract himself from the situation with afterburner. He bounced across a grassy area, struck a distance marker getting back on to the takeoff runway and finally got airborne. Somewhere in this "extracting" maneuver the left tire blew.

The tower cleared the aircraft to land on any runway and the pilot completed a low visibility approach. He touched down safely but as speed decreased, directional control was lost due to the blown tire and the F4D angled off the side of the runway at very slow speed where it bogged down in soft ground.

The lead pilot meanwhile, completed a second GCA at a slower airspeed and landed without incident.

As a result of the circumstances surrounding the incident, a few corrective measures or recommendations were made which may be of interest, or worth discussing, in other units operating similar high-performance equipment:

● The squadron SOP was revised to state: Pilots will shut the engine down immediately after touchdown when landing

Hail Inside and Outside



IT'S COMMON knowledge by now (and also good sense) to stay out of that aircraft wrecker called the thunderstorm. The severe turbulence, pounding hail and drenching rain have probably been experienced by all fliers to the extent that there is no need to go into a long harangue to convince pilots who, by and large, are already convinced that flight in thunderstorms is strictly for the hailstones.

More recently it came out that flight in the clear air below the anvil top or close to the sides of the thunderstorm was no automatic guarantee of freedom from hail and rough air. This too has joined the collection of aviation truisms which also includes landing gear up.

Now a third danger region begins to appear. The advent of aircraft with the marginal capability of climbing over the thunderstorm

cloud brings into our ken the upper side of the anvil top. At these altitudes (well over 40,000 feet at times) some jets begin to approach their service ceilings. The conditions just above an anvil top — turbulence and temperature—may easily lead to compressor stall or flameout. And the idea of falling into a thunderstorm from above is no more attractive than the thoughts of entering it from the side or climbing into it from underneath. The worst part of all this is that the anvil top looks disgustingly like harmless cirrostratus cloud. What to do?

The most helpful way of avoiding this newest thunderstorm trap is a combination of AWS and GCI. Let your weatherman on Channel 13 Pilot-to-Forecaster Service do his bit to help you avoid thunderstorm areas.

—USAF "Prevention Tips"

during heavy rain and reduced forward visibility.

● The squadron will renew Dow-Corning rain repellent on windshields every 15 days.

● All squadron pilots have been advised of the amount of increased landing roll required for each 5 knots of touchdown speed in excess of 135 knots. Further emphasis has been placed on the requirement for planning a touchdown close to the runway landing area marker.

● Continued emphasis is being placed on the importance of all aircraft in a given flight establishing contact after a frequency change.

A nearby field, which was a suitable alternate, had 15 thousand scattered and 10 miles visibility at the time the flight began penetration. Comments on this aspect of the incident refer back to the time the F4Ds were cruising "on top." When weather conditions became evident the approach should not have been attempted, if begun, broken off. Squadron SOP states that a diversion will be instituted if field conditions are heavy rain. In all flight planning the precipitation condition must be considered as well as static visibility (ground observation) and ceiling.

Accumulated Trouble

IT WAS a beautiful day at El Toro when I walked into the weather office to prepare for a *Banshee* hop to Denver. From the forecast it was going to be a pretty good day at Denver too; 1000 scattered, 10 thousand thin broken with 20 miles visibility.

I was off the deck at 0920 on a VFR climbout, estimating Daggett at three four. Daggett went by one minute late. All was pretty much as planned until I hit Grand Junction. Salt Lake Center was given my position report and I casually asked for Denver weather. Oops! Denver is down to 300 and one you say? (Where *does* this stuff come from so fast!?)

Oh well, Colorado Springs had a high broken overcast so I amended my flight plan to read Grand Junction, direct Colorado Springs. While waiting for the clearance I tuned in Colorado Springs and tried to get an identification signal on the bird dog. No dice. Some minutes later I had gotten neither Colorado Springs, Denver radio or even a Denver commercial radio station. Thunderstorms had snookered the whole area with static. UHF calls to Denver and Colorado Springs netted me nothing.

At this time I went to guard and transmitted in the blind, declaring a deferred emergency, lost in the Denver area and requesting a DF steer. Cannon

AFB down in New Mexico came on the air and offered to guide me to their field. I accepted forthwith.

Shortly thereafter I was able to get several bearings on Amarillo radio which I passed on to Cannon. By this time I was staggering along at 48 thousand



for fuel conservation and also because the cloud tops were about 40 thousand. My approximate position was northwest of Cannon and they asked me to descend to 20 thousand. I shut down the left engine for further fuel conservation and started down in a "brakes out" 4000 feet a minute descent.

At 41 thousand the cloud tops came up to meet me and I slipped into the soup at about 220 knots. As the altimeter spun down to about 33 thousand my real trouble started. I hit either a cyclone or thunderstorm which slammed me on my back and put me in a spin. I lost about a hundred knots which put me at 130 so I pulled in the brakes as part of my recovery.

When I was about one third of the way through recovery I popped out of the bottom of the high layer. Another deck was below me so I got clearance to descend VFR down to the top of the lower clouds. At 9000 feet I leveled off and Cannon GCA picked me up. Even though I was about to be rescued, Cannon weather was nothing to get cheerful about. They were reporting a 100-foot ceiling and one-half mile visibility with rain showers lurking around the area.

I had requested a warning on GCA final so that I could light off the other engine and this warning came about 17 miles out, along with the landing cockpit check. As I lit off number one I dropped gear and flaps. At 15 miles heading was corrected from 210 degrees to 200 degrees.

Very soon after this mileage check I got instructions for a waveoff. This came as a surprise. Things had been going



The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in ready-rooms and line shacks. All reports are considered for appropriate action.



— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

along normally and I wondered "What now?" After climbing back on top again I checked in and was told that GCA had a power failure.

Now the *Banshee* is as long-winded (fuel and endurance) as most jets, even better maybe in this case, but I didn't think it was long-winded enough to wait out a lengthy repair to GCA's power supply. We hadn't gotten around to discussing the expected duration of the delay when I spotted the ground through a small hole in the clouds. That decided it. I announced I was going to let down VFR at the same time that I pushed the nose over.

The *Banshee* wailed down and around through some five thousand feet of altitude and finally I was somewhat VFR—but just barely. I was forced down to 200 feet above the deck before I could level off beneath the "ceiling." Visibility was about two miles.

Truth is somewhat stranger than fiction. I scorched the sagebrush for only a few moments and then an airfield came into view. Even as low as I was, I was still in contact with Cannon so I described the layout and asked for the length of the runway and field elevation. To my query of "where am I?" they told me it must be Portalis airport and that it was 4000 feet high with a 3700-foot runway. I answered that I would land there.

Because of a rain squall I had to shoot my landing downwind, which added to my difficulty. Touchdown was at 105 knots, ve-r-r-y close to the threshold. It may be that I hit short because a flat left tire started swerving me to the left as soon as I was firmly on the runway and decelerating.

Hard right brake stopped the left swerve but it did start the aircraft angling to the right. Angle—shmangle . . . stopping within the airport boundary was



my biggest problem at the moment so I held brakes and let it angle.

I finally went off the right side of the runway and rolled straight ahead to a stop. I just sat there a moment and savored the peace and quiet (it was that special kind of quiet where you don't even notice the engines).

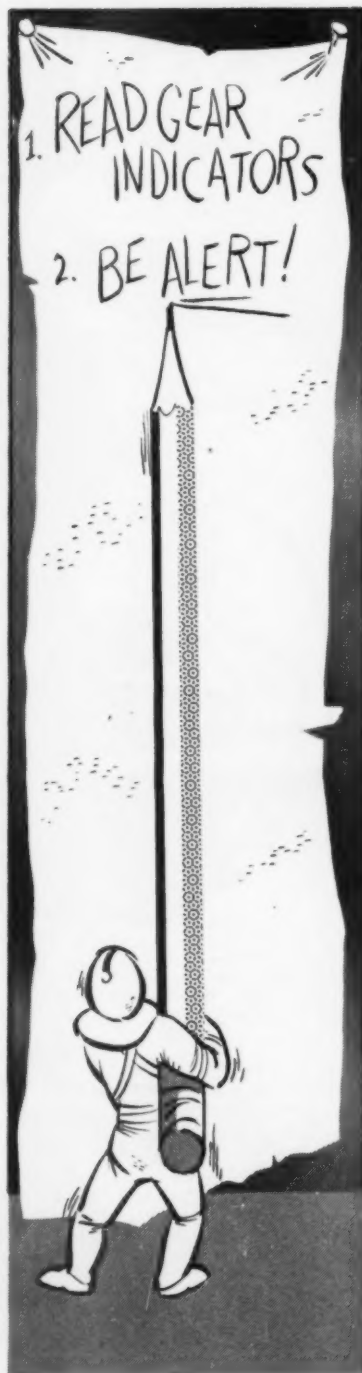
After taking inventory I saw I was only 30 feet off the runway so I added power and started to get back on the hard surface. The airplane dragged to the left due to the flat tire and I got the nose wheel and right main on the runway but the left main bogged down in the mud. This problem overwhelmed me. It had been a long day. I was tired. At this point I shut down and settled back to wait on my transportation coming over from Cannon AFB.

BREAK OR BUST

OUT observing runway operations the other day I saw a four-plane section come down the service runway in a tight formation and break with a crisp even interval that makes any professional pilot feel all warm inside. Only—the last man tried to outdo the others by breaking sharper and tighter.

This stove-pipe wobbled, started up-and-over and lost about 300 feet before the pilot regained control and leveled out. Luckily he was flying a good honest airplane. I looked him up later but didn't say anything since one look at his face indicated how well he knew he had almost bought it. And why!

He forgot one tiny detail—and that one almost killed him. In a 70-degree bank at constant altitude, load factor and stalling speed are doubled—220 knots instead of 110 is a big difference—just as big as the difference between life and death.



PENCIL PUSHER

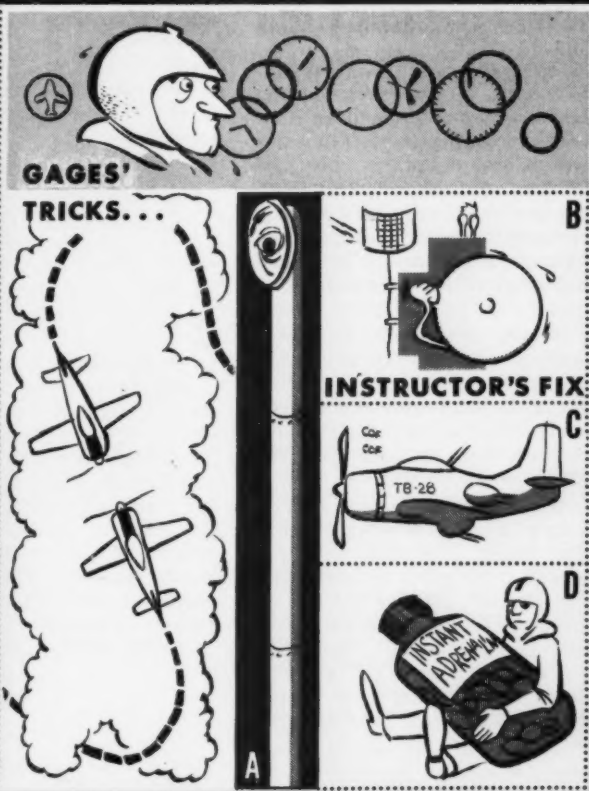
I WAS leading a flight of two A4Ds into the break after completing a two-hour GCI bogey mission followed by a 10-minute tail-chase. Since I am a staff type pencil pusher, I was determined to look as sharp as possible so that the squadron owning the aircraft would be inclined to invite me to fly with them again.

All of the necessary radio transmissions with the tower had been made and I was cleared to break right for runway 2. The break was a sharp bank of about 60 degrees with reduction of power to 70 percent and speed brakes extended. At this point the runway duty officer came up on the tower freq with "This is the RDO, wish to advise excessive winds."

That one stumped me. I asked the RDO for the estimated knots and direction. No answer. Again I requested the winds. Still no answer then the tower came up with "winds 330 degrees, 10 knots." I could hack that I said to myself.

By this time I was past the 180 spot; flaps and speed brakes down (wheels still up!). I touched the gear handle, checked the gear indicators, read UP, UP, UP for all three wheel positions and you guessed it, called the tower, "180, all down for final."

At about the 45-degree position the air was filled with red flares from the wheels watch and I waved off. Just a gear-up pass without serious consequences, thanks to the wheels watch. These are old and often repeated rules but they are not out of date: (1) *read* your gear indicators, not just look at them. The gear handle should be checked in the *down position*, not just checked. (2) Communication interruptions in the pattern are a frequent cause of gear-up landing accidents and should be cause enough to alert a pilot.



ONE of the most lethal menaces here in the basic training command is that great naval character — the solo student. Daily he takes to the air and diligently pursues his training. So diligently in some cases that he never lets the gages out of his sight. You'd think they would knock one another off at an alarming rate but somehow they don't. They do manage to give all the instructors some sleepless nights however.

This Anymouse and his student headed out to give the student an introduction to spins. On the second try the student completed his normal clearing turns (around this mad house a "normal" clearing turn is at least 45 degrees of bank for 180 degrees of turn.)

Unknown to us at this time, our solo friend, "Gages," was under our upraised wing on the same course practicing wing-overs. Completing his clearing turn my student raised the nose and swooped into the spin. "Gages" meanwhile, had gone over the top of his wingover and started back our way.

After one turn of the spin, "Gages" appeared out of the blind spot, headed directly for us and about 300 feet below—still apparently keeping a close eye on that old airspeed. To put it mildly a frantic spin recovery, followed simultaneously by a steep diving turn was initiated by this Anymouse. The two airplanes had about 50 feet separation as they passed.

My student recovered and we

began to climb back to altitude, only to find "Gages" now reversed and boring in on us again. More violent maneuvers followed with a few thousand choice words over the ICS. We finally escaped him and spent a few minutes in nice, comfortable straight and level flight putting our nerves back in place.

Three or four "fixes" are possible: (1) periscopes for viewing blind spots, (2) radar alarm with loud bell, (3) gun pods to give the instructor a fighting chance, and (4) instant adrenalin pills for super reaction.

So you guys in the fleet think you got it tough—we got old "gages solo" for bigger and better thrills than a night cat shot that turned cold.

Please Turn Page 19

AGAIN & AGAIN

THE subject of reversed controls came up the other day and I had occasion to recall an incident concerning an S2F. It seems two pilots picked up this S2F from a repair activity for delivery to their own squadron. They "bought" the aircraft and zoomed off toward home, a thousand miles away. End of story? Not quite.

Several days later the repair activity received the news that the S2F had arrived at the squadron with reversed aileron controls. *But*, only the copilot's controls were crossed up. The pilot's were normal.

Of course the repair activity didn't have much defense but if you think a moment can you consider the pilots entirely without blame? Apparently the copilot's controls were never locked and checked before takeoff and the condition came to light only when the airplane was turned over to the man in the right seat.

An aircraft just out of repair, maintenance or overhaul is susceptible to this sort of thing. A "strange airplane" check for some S2F drivers includes one man watching the direction of the control movement out of the top hatch when the item "controls; freedom of movement and full travel" is covered.

CAN YOU TOP THIS?

IT WENT IFR at 0855 . . . several of same type aircraft were airborne . . . FAM, no less . . . recalled . . . good head. Pilots were told to make a VFR approach, because they are FAM . . . by this time the weather is down to 400 and one.

One stalwart was using his head and making an actual GCA. The FAM boys were calling in VFR. "Stalwart" stated they

couldn't possibly be VFR . . . tower couldn't see them as they made the break . . . Wow!

One of the FAMs appeared out of the mist and landed. Others were hitting the downwind at 100 (feet?) or less.

FANTASTIC

THIS is fantastic and a little hard to believe but it is true, and, according to GCA, happens three or four times a month!

Approach control turned a section of "Fords" (F4Ds, what else?) over to feeder control. They were identified by series of turns and were controlled around the pattern for a PAR. Prior to the turn to final a bogey was called and acknowledged for, as having passed. This was indicated on the scope. No other targets in the area.

Feeder control turned the air-

craft to final heading and control was passed to the final controller. Approach was normal. Glide slope interception was at five miles, 1500 feet and the aircraft was controlled to the end of the runway with a right wave-off given and executed.

When the controller unkeyed his mike, his two Fords advised that except for the fact that it was a *practice* GCA, he had just descended two F4Ds into the ground, six miles short of the runway.

From interrogation of all personnel concerned, including the pilot of the chase F4D, the initial pickup was proper. GCA was controlling a target but not the intended ones. The only logical but highly difficult to believe solution, is that some clown, having nothing better to do, tuned in a GCA frequency and executed this approach in front of the directed aircraft.





BOTTOMED OUT

AFTER shooting two field mirror landings at an outlying field in an S2F-1, the copilot called "paddles" and reported "Gear-down, props-up." The turn from the 180 position was started but after 15 or 20 degrees of turn the seat dropped out from under me (pilot at the controls). This sudden drop caused me to bring the throttles and yoke back.

With no power and the nose cocked up, the airspeed rapidly dropped toward stall. I slammed the throttles forward and dropped the nose. Then I leveled the wings, got the gear coming up and called for $\frac{3}{4}$ flaps as tree-top level approached. Thanks be for waveoff procedures being drummed in until they are automatic.

About this time, still trying to get my seat up, I happened to notice there were only 2400 turns on the port engine (what

an overboost!) Number one prop control was pushed to full increase but we were still too low and too slow to chance reducing power.

Finally, with 110 knots the power was pulled back to 45 inches and 2500 rpm. At 500 feet altitude it was further reduced to 30 inches and 2300 rpm, and at 1000 feet power was cut to 30/2100. Paddles advised us to return straight to home field, which we did with no further trouble.

Upon getting in the cockpit I had found the seat at the right height and strapped in, just hitting the lock handle to check it. The same exact thing had happened to the copilot one month previously. Now we both move the seat, even if it is at the right height, and doublecheck it locked.

ALTIMETER HANGUP

A couple of days before Christmas, while making an actual GCA to NAS Miramar, I was cleared to descend to and maintain 2400 feet until reaching the glide slope. I descended at 1300 fpm and 150 knots as recommended on the approach plate. I leveled off (I thought) at 2400 feet; at least my altimeter appeared to be holding steady.

The GCA controller told me I was slightly below my assigned altitude but because of my altimeter reading I continued on at the same power setting. The next transmission from GCA told me I had gone off the bottom of their scope and to execute an emergency pullup.

I went into afterburner and commenced a max angle climb. It was then that I noticed my altimeter still indicated 2400 feet. I tried the first rule for troubleshooting and hit it with my fist. That freed the needle and it unwound and caught up passing through 1500 feet. All this was still in the soup.

The mountains to the east of Miramar which you pass over on an approach are up to 1400 feet.

I climbed back to 2400 feet and finished the GCA to a final landing.

Investigation revealed that a burr in the altimeter had caused it to stick at 2400. From now on my rate-of-climb will be included in my instrument scan, even when holding an assigned altitude.





headmouse

Have a problem, or a question?

Send it to

he'll do his best to help.

Cougar Wheels

Dear Headmouse—

Has there ever been an instance of an F9F-6 becoming airborne with the rear bearing of the main landing gear being left out? If so, please cite the incident, damage, ...

J. J. KILLEAN, ASGT
H&HS, MCAS Navy 990

FPO, San Francisco, Calif.

► NASC records dating from Aug 1954 to 15 Jan 1960 do not include such a report. However, it is possible such an incident took place without ever having been reported.

Please turn to page 44 for a report involving an F9F-8B and other F9s with wheel difficulties.

Very resp'y,
HEADMOUSE

Alternates

Dear Headmouse—

I have just signed my name as pilot in command on a DD-175 for an IFR flight to NAS Podunk. Their current reported weather is 500 feet overcast, visibility 1 mile. The duty forecaster says that Podunk will remain 500/1 until I am about one-half way to Podunk, but he assures me that Podunk will be at or above 5000 feet and 5 miles at my ETA, and will remain so for at least 2 hours thereafter. He enters 500/1 for the current weather, and 5000/5 for forecast weather in the destination block of my flight plan.

At this point my question is "Do I need an alternate airport to comply with CNO regulations?"

The answer is YES if I refer to OpNavInst 3140.36—it states that the destination forecast for a proposed IFR clearance without an alternate will be valid for the en-

tire period from ETD to ETA plus 2 hours (ETE plus 2 hours).

The answer is NO if I refer to OpNavInst 3720.2A (Section III, paragraph 1.h.)—"An alternate airfield is not required when the weather at destination is forecast to be at or above 5000 feet ceiling and visibility of 5 miles for ETA plus two hours."

My conclusions are:

a. The duty forecaster erred in that the forecast he entered on my flight plan for my destination should have been the lowest forecasted for any time during the period from ETD to ETA plus 2 hours, that is 500/1 vice 5000/5. OpNavInst 3140.36 is detailed instructions to the weather service on the mechanics and procedures for entering weather data and forecasts on DD-175s and should be followed to the letter by weather service personnel.

b. An Operations Duty Officer who would sign any clearance

without an alternate would be in error since the reported weather for Podunk is below 5000/5.

c. An alternate airport is required for my proposed flight.

E. C. "WHIDBEYMOUSE" CHASE, LCDR
Operations Department

NAS, Whidbey Island

► Egad—back to the drawing board! It looks like you've unearthed a genuine conflict, Whidbeymouse, which we can't answer here and now—but will pass it along to the conflict-resolvers for a solution.

One thing about your chronology puzzles us though—do you really ask yourself the question *after* the weather-guesser has scribbled on your DD-175? When you slip your DD-175 to the forecaster for his weather entry, you should *know* whether or not an alternate is needed—if you complied with OpNavInst 3710.7A, Sec. IV, para 2b(10)(f) which says, "Pilots are responsible for reviewing and being familiar with weather conditions for the area in which the flight is contemplated." Now, if it is your practice to do this at the time you get the weather cranked onto your DD-175, you should stop and refer to the prescribed sequence for flight preparation in the same Section, para 2e(1), "Pilot reviews the weather conditions and completes the DD-175," and 2e(2), "Aerology completes pertinent portions of the DD-175." If you are juggling your fuel load against your passenger or cargo load, you have



"The field's just on the other side of that thunderstorm, cancel our IFR."

to decide some time before filing time that you must bump 400 lbs of cargo and load enough fuel for an alternate, no?

We agree with your conclusions, which is why we always apply the Headmouse rules:

1. Select an alternate for the same reason you carry a spare tire in your car.

2. Then determine if fuel/payload weight will be ticklish.

3. If it's not ticklish, go—with an alternate and adequate fuel.

4. If it is ticklish, check to see whether you really need the alternate.

5. If you don't need it, go with no alternate, full payload and adequate fuel.

6. If you do need it, leave some cargo on the ramp, load adequate fuel for the alternate requirement, and go.

Very resp'y,
HEADMOUSE

How Unconventional Is a Jet?

Dear Headmouse:

Isn't it about time the Navy got around to acknowledging that there's nothing very unconventional about a jet-engine-powered airplane? We hear and read frequent reference to "... jet aircraft and conventional aircraft ..." and I think it's high time we began to



admit that the terms of comparison are rapidly growing out of date. There was a time when the old folks referred to "conventional" (i.e.—high-button) shoes and those new-fangled low-cut oxfords, but we'd be silly to apply the same terms today.

And while we're at it—what kind of landing gear is "conventional" in this modern day? We still talk of tricycle gear and "conventional" gear, yet we graduate crops of young naval aviators who have never flown an airplane with "conventional" landing gear!

... When something becomes commonplace through widespread use and acceptance, let's not tie it down by inappropriate marriage to a relic. There was a day when cannon, charged with gunpowder, were "special weapons"—very special weapons; will we cling to the same term when nuclear firecrackers are sold in the dime store?

VERY CONVENTIONAL JET PILOT,
WITH VERY CONVENTIONAL
TRICYCLE GEAR.

► According to the USAF dictionary this "term is a point-of-view term. For those living in the years between 1903 and 1925, it signified a biplane; for those living through WWII, it signified a propeller-driven monoplane; for those living in 1950, the term became ambiguous, signifying either the propeller-driven or the jet-propelled fixed wing monoplane or both. Some users in 1955 applied the term to the jet, reciprocating engine, turbo-prop and helicopter airplanes." What is conventional today is outmoded tomorrow, what is unusual or unsanctioned today may be the usual or the customary tomorrow. Date yourself.

Very resp'y,
HEADMOUSE

Frequency Card

"Contact Norfolk Center on 323.0 immediately"—"Quick, do we have it?" ... "I'm looking, I'm looking, shaddap and fly the airplane ..." Eventually you'll find whether or not 323.0 is set up, and on what channel ("no, we don't have it, crank it in or ask 'em for another freq ..."), but wouldn't you find it quicker and easier to get the answer if the preset frequencies were listed in numerical order? You nearly always look for a frequency first, and then see what channel it's on—so why not put the horse in front of the wagon? If you fly with a copilot

this might not be a very big thrill, but the fly-alone boys might really appreciate it.

Here's a sample of what such a freq. card might look like for the Norfolk area. If you like the idea and want to adapt it for your standard channelization, the idea is yours for almost free—all we ask is that you send us a safety tip or hint that others might like to use. Our thanks to Capt. Roy C. Ihde, USAF, of Offutt AFB for this gimmick, which appeared in USAF "Flying Safety," March, 1960.

Freq.	Chan.	Service
255.4	6	Primary VFR Position Rep
257.8	16	Control Tower—Civil
263.6	11	Approach Control Navy
272.7	5	Primary IFR Position Rep
301.4	7	ARTCC/FSS
309.2	13	GCA
310.6	12	GCA
312.4	14	GCA
318.2	18	Washington Center
318.6	1	Ground Control
326.8	15	GCA
340.2	2	Control Tower—Primary
344.6	10	Pilot to forecaster
350.2	9	Norfolk Departure
		Control
353.9	17	Washington Center
360.2	13	Control Tower— Secondary
360.6	8	Norfolk Initial Enroute
383.8	4	Norfolk Departure
.....	19	As required
.....	20	As required
243.0		Guard Military Emergency

I HAD BEEN IN ST. LOUIS (HAD A REAL BALL, TOO) AND WAS RETURNING TO QUONSET PT. THAT'S UP IN RHODE ISLAND. FOR THE TRIP I WAS CO-PILOT FOR A @!#!?! (OOPS! EXCUSE ME, KIDS) FOR A FILLER CALLED **WILL RISKIT!!**



Ascent into a Maelstrom!

THEY TOLD US THE WEATHER WAS GOOD TO QUONSET EXCEPT FOR POSSIBLE SCATTERED (CHOKE ::) **THUNDERSTORMS...**



NOW! I DUNK THRU ALL WEATHER FLIGHT SCHOOL. IT'S TOO BIG TO GO AROUND SO WE'LL ANCHOR HERE OVER ALBANY, GET A WEATHER REPORT, AND THEN DECIDE WHAT TO DO...

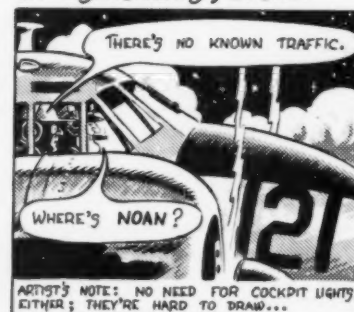


EDITOR'S NOTE: THIS IS A HOLLYWOOD SNOB! REAL QUIET. NO NEED FOR INTERCOM...

ALBANY RADIO GAVE A WEATHER SUMMARY. NOT MUCH INFO. BUT QUONSET WAS CLEAR, NO DETERIORATION EXPECTED SO, WE FILED UNDER INSTRUMENT FLIGHT RULES AND WERE CLEARED AT 7000'...



WE HAD SUFFICIENT FUEL TO GET TO QUONSET AND AN ALTERNATE. WE PREPARED OUR ENTRY ~ SHOULD DER HARNESS, SAFETY BELT, SLOW COMFORTABLE MACH NO., GOT ON INSTRUMENTS, ETC....



ARTIST'S NOTE: NO NEED FOR COCKPIT LIGHTS EITHER; THEY'RE HARD TO DRAW...

THE COCKPIT LEAKED LIKE A SIEVE; WINDSHIELD WIPERS WERE INOPERATIVE...



BUT THEN...



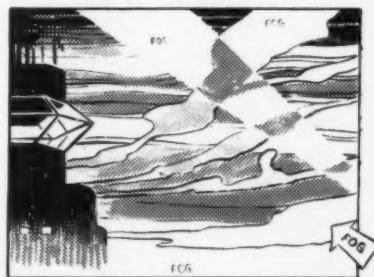
TOO MUCH STATIC TO RAISE ANYBODY. MACH INDICATOR WENT OUT AT 82 KNOTS.



I FINALLY GOT ALBANY ON VHF AND TOLD THEM WE COULDN'T MAINTAIN ASSIGNED ALTITUDE...



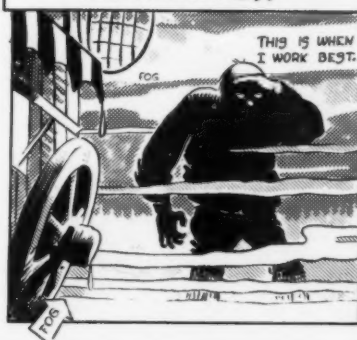
WE FOUND WE WERE ALMOST TO OUR DESTINATION WHICH MEANT A GROUND SPEED OF ALMOST 200 KTS. DURING A 'CLIMB' OF 6,700 FT. AND WAS QUONSET CLEAR? NOT ON YOUR LIFE!! FOG.



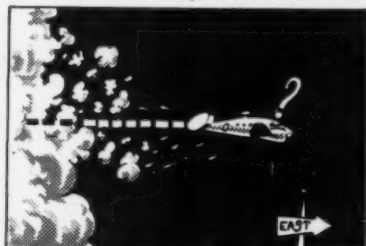
I WAS SCARED! THEN I GLANCED BACK TO SEE HOW THE PASSENGERS WERE DOING...



GCA PICKED US UP THEIR LOOKOUT OUTSIDE THE WAGON REPORTED THAT THE FOG WAS LOWERING!!



I WAS TEMPTED TO JOIN THEM. THE AIRPLANE FELT LIKE IT WAS COMING APART. THEN WE LEVELED OFF AT 13700 FT. AND BROKE INTO THE CLEAR.



NOW ALL WE HAD TO DO WAS GET TO QUONSET AND LAND THAT THING.

WE DIDN'T FIND THE RUNWAY ON THE FIRST APPROACH...



ON THE SECOND APPROACH RISKIT SAW THE RUNWAY LIGHTS. HE GRABBED THE CONTROLS AND LANDED THE AIRPLANE.

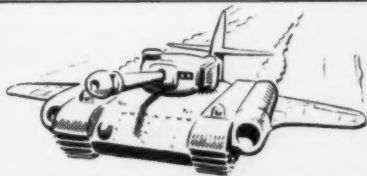


I WAS SO SHOT I COULD HARDLY MOVE AND A GOOD THING FOR RISKIT. AS FOR HIM, HE SHOWED OFF AFTER A CURSORY GLANCE AT THE PLANE.



WHEN I GATHERED MYSELF TOGETHER I INSPECTED THE PLANE AND FOUND IT SORT OF ROCK-MARKED FROM HAIL AND THE PITOT TUBE WAS TWISTED BUT WHEN I THOUGHT WHAT COULD HAVE HAPPENED - WELL...

THERE HAD BEEN REAMS OF LITERATURE WRITTEN ON HAZARDS OF FLYING THUNDERSTORMS.



THERE WAS NOTHING I COULD ADD. BUT I DID RESOLVE NEVER AGAIN TO FLY INTO ONE OR INTO AN AREA WHERE ONE COULD BE EXPECTED-



THUNDERSTORMS AND THE ATC

By Charles A. Clift
Chief, FAA Liaison Branch
Hq. Tactical Air Command USAF

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NUMEROUS articles have been published during the past year concerning the effect on aircraft flying through thunderstorms and proper techniques for flight through conditions of extreme turbulence. These articles have been excellent in their description of areas that should be avoided, methods of determining areas of least turbulence and flight techniques to follow when turbulence is encountered.

Whereas, I do not intend to minimize the importance of the subjects covered in these articles, it is desired to point out the hazardous situations that can be created through following some of the procedures recommended without properly advising air traffic control.

I imagine that nearly all pilots on more than one occasion, while operating through the tops of cloud formations, have observed other aircraft operating above or below them with 1000 feet of separation and wondered what effect this separation would have in turbulent weather conditions. The answer to this is that Air Traffic Control is depending on the pilot to keep them informed when turbulence is encountered, when deviation from course is required, and any emergency change in altitude. If sufficient information is given promptly ATC will be in the position to increase separation between aircraft in a manner that will eliminate possible confliction.

As an example of how a flight can get involved in a hazardous situation and make a nervous wreck of the air traffic controller, I would like to relate the experiences recently encountered by a pilot which were reported to me.

On a flight from an East Coast base to Tinker Air Force Base he was cleared to maintain 8000 feet; turbulence was encountered and ascent to 11,000 feet could not be avoided. He managed to descend again to 8000 feet and then he was forced again to 11,000 feet. This procedure occurred once more when he decided that he should, if possible, remain at 10,000 feet. An Air Traffic Control clearance was requested and, after some delay, word came back that the request could not be approved because of another aircraft at approximately the same position at that altitude. Rather than continuing to fight to maintain his altitude, he left the airway maintaining 10,000 feet until he could obtain an amended clearance from Air Traffic Control. What pilot cannot relate experiences when he was forced from assigned altitudes; and although extreme displacements do not occur frequently to any one pilot, it is a significant problem to Air Traffic Control and cannot be ignored.

In order to more fully understand the impact of this type of operation on the Air Traffic Control

system, let us review what is done today when thunderstorms are encountered.

Flight crews initiate practically all action for deviation from route or altitude in order to circumnavigate thunderstorms. These pilot requests become a complex problem for Air Traffic Control since they seldom are received singularly but similar requests are received from several pilots almost simultaneously. Whenever it becomes necessary for a pilot on an IFR plan to deviate from his approved route or altitude(s), a problem immediately presents itself to the air traffic controller. The affected area must be studied and an attempt made to accommodate the aircraft for the proposed route of flight. Revision to estimates must be made and adjacent or converging airways or area must be considered. Therefore, it is important that the request for deviation from route be forwarded to Air Traffic Control as far in advance as possible. Delay in submitting the request, or inability to do so, may delay or even preclude ATC approval of the request, or require additional restrictions be placed on the clearance.

A pilot on an IFR plan must not deviate from route without proper clearance as this may place him in conflict with other air traffic. Strict adherence to traffic clearance is necessary to assure an adequate level of safety. In those instances where thunderstorm conditions encountered are of such severity that an immediate deviation from course is determined to be necessary and time will not permit approval by ATC, the pilot's emergency authority may be exercised. In case emergency authority is used to deviate from the provision of an Air Traffic Control clearance, the pilot in command shall notify air traffic control as soon as possible and, if necessary, obtain an amended clearance.

Insofar as possible, the following information should be furnished at ATC when requesting clearance to detour around thunderstorm activity:

1. Proposed point at which detour will commence.
2. Proposed route and extent of detour (direction and distance).
3. Altitude(s).
4. Point and estimated time where original route will be resumed.
5. Flight conditions (IFR or VFR).
6. Any further deviation that may be necessary as the flight progresses.
7. Advise if the aircraft is equipped with functioning airborne radar.

When flying within the Continental Control Area, the proposed detour should be defined by appropriate navigational aids (however, not necessarily over or directly between such aids).

When this is not possible and air traffic exists at the desired altitude, ATC will be unable to approve the detour. In such cases, ATC may offer a clearance via the detour route at a different altitude. When an alternate altitude is not available, the pilot may elect to detour under his emergency authority.

Situations such as the one related by the pilot enroute to Tinker should be avoided if at all possible. Although he was in the right by exercising his emergency authority in leaving the airway after being unable to obtain an amended clearance, it is highly probable that ATC could have effected separation from the other traffic and approved amended clearance if they had received prompt information on turbulence being encountered. The pilot of this flight passed through the 10,000 feet altitude level five times before he descended to 10,000 and notified ATC of his intentions. During each of these changes there was a good possibility of collision with the aircraft operating on an approved flight plan at 10,000 feet.

With the increase in number of aircraft equipped with weather radar, the requirement for deviation from assigned altitudes is decreasing, but deviation from route for radar tracking around thunderstorms can still cause considerable confusion to the traffic flow pattern. Even though deviation may be within the confines of the flight planned airway, it is essential to ATC that they be advised that thunderstorms are being circumnavigated in order that revisions to estimates may be made and confliction avoided at subsequent fixes. This same procedure holds true for pilots

Overheard in a "moderate" thunderstorm

"Look on the bright side. You can't buy experience like this from an instructor."

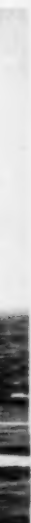
desiring radar vectoring from ground based radar facilities, other than air traffic control radars. Prior to requesting radar vectoring, the pilot must first advise ATC that they desire to contact a specific station for radar vectoring and receive approval to change to the appropriate frequency.

In summary: Areas of severe turbulence should be avoided, but when encountered, ATC should be promptly advised of your desires and any action taken. Aircraft separation is predicated on information furnished by the pilot, whether it is included in the flight plan, position reports, or amendments to flight plans. Incorrect or insufficient information furnished to Air Traffic Control, or failure to adhere to Air Traffic Control clearances obliterates the efficiency of the Air Traffic Control system. The air traffic controller is a highly experienced aviation expert whose major aim is to assist the pilot in safe conduct of flight and avoidance of collision. When you help him, you are giving better service to yourself.



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Refresher Course: THUNDERSTORMS

THE following comments are offered by a staff meteorologist of a leading airline . . . in the hope that it will start pilots thinking on matters concerning spring and summer operations.

Turbulence

The chances of encountering severe turbulence are less in the upper and lower thirds of cumulonimbus clouds than within the middle third. Jets, therefore, should probably fly as high as possible while piston aircraft are probably better off below 10,000 feet, provided ample terrain clearance can be maintained.

Bumpiness in T-storms has been found to be very localized and of limited duration. One aircraft may encounter very severe turbulence while another aircraft only a short distance away (either horizontally or vertically) may encounter no turbulence at all.

Icing

This has not proved to be a serious problem because of the relatively short time spent in traversing this type of activity. About 400 of the U. S. Thunderstorm Project traverses were made at temperature below freezing. Clear ice was encountered on only five penetrations and accumulation in all cases was less than $\frac{1}{16}$ ". Wet snow packing on wing leading edges was experienced during 340 traverses, but maximum accumulation was $\frac{1}{4}$ ".

During 500 miles of flight within cumulonimbus in the United Kingdom, difficulty was experienced only twice. On one occasion very heavy airframe icing was experienced during a flight of about 25 miles along a line of T-storms.

Carburetor icing, however, is fairly frequent, occurring most often at temperatures between +18° C and -10° C. Use carburetor heat as recommended in the operating manuals.

Hail

Unfortunately, there is no way of recognizing in advance a thunderstorm which may produce hail. Inasmuch as hail reaches its maximum size at or near the freezing level, the best procedure is to stay as far above or below the freezing level as practicable.

Static-Electric Discharges

These are not confined to flight in T-storms, but most do occur under these conditions. The static charge is induced by flight through solid particles such as ice crystals. Most discharges occur with the temperature between 0° and -10° C, so here again the freezing level is a good place to avoid.

Sometimes the imminence of a static discharge is manifested by a build-up of "precipitation static," particularly on the high and medium frequencies, or by the appearance of St. Elmo's fire along the windshield surfaces or around the periphery of the propellers. At other times, however, there is no warning whatsoever.

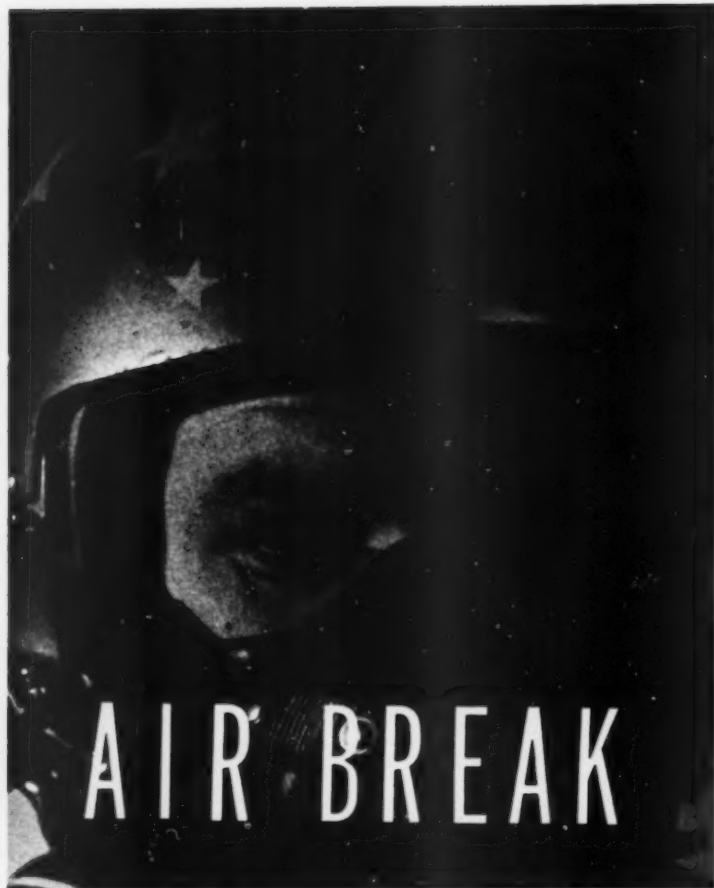
If there is warning, prompt reduction of speed will decrease the probability of a discharge. Static charges build up because of the friction between the aircraft and the solid particles in the atmosphere. Therefore, the rate of charge is proportional to the square of the airspeed. Also, reduction in RPM will lessen the chances of a discharge off the propellers.

Summary

1. Most turbulent area is usually throughout the middle third of the vertical cloud structure.
2. Most and heaviest icing is in conjunction with air temperature of 0° to -10° C.
3. Hail is most likely encountered at or near the freezing level. Here the hailstones are largest.
4. Most static-electric discharges occur near the freezing level.

Recommendations

1. Where possible avoid flight in thunderstorm activity. Circumnavigation at highest levels is preferable if height of the tops permit.
2. If high-level circumnavigation is not possible, second best level is at 10,000 feet or below, and below the cloud bases if terrain clearance is adequate.
3. Avoid flight at or near the freezing level.
4. Slow the aircraft to best penetration speed as prescribed in operations manuals. — *Flight Safety Foundation, Inc.*



By

LCDR Channing L. Ewing, MC, USN

Naval Air Material Center

ONCE upon a time, there was a *Cougar* squadron stationed at Cecil Field. One day a squadron pilot called in to Cecil Tower stating that he felt "weak" and that the instrument dials were fuzzy and that he thought he had hypoxia and was returning to base.

After a normal landing, he was immediately examined by the flight surgeon and found to be in good shape with no evi-

dence of hypoxia other than a pale face. A check of the aircraft oxygen supply and regulator was made and no abnormality found. The pilot stated that the mask was the proper size for him but that with his thin face he had to tighten it up quite a bit.

Thorough examination of the pilot showed no physical defects which could be a cause of hypoxia. The A-13A mask was

examined both by the pilot and the flight surgeon and no abnormalities were noted. That is, until the flight surgeon happened to hold the mask up to the light, quite by accident, and saw light coming through the exhaust port, past the exhalation valve. The exhalation valve was *completely unseated*, but neither the pilot nor the flight surgeon had noticed this on their examination of the mask. The mask, even with the exhalation valve completely unseated, *would still pass the functional tests in a manner satisfactory to most pilots*, unless distorted slightly by pulling "G" or by tightening the mask.

The net effect was this: oxygen still entered the mask through the inhalation valves at all altitudes and at the proper concentration, whether on 100 percent or on diluter demand; but once in the mask, it was diluted to some extent by cabin air entering the mask by bypassing the exhalation valve around the exhaust port.

The amount of oxygen dilution varied from one moment to the next, depending upon facial movement, amount of mask tightening, presence or absence of "G's" being exerted on the mask, or any other factor(s) which would cause a distortion, however slight of the exhalation valve seat.

Unfortunately, and most importantly, the amount of dilution would probably not be sufficient to cause hypoxia except at the higher altitudes and lower cabin pressures, but would definitely cause hypoxia at or above any altitude at which 100 percent oxygen was required to *prevent* hypoxia. The hypoxia would be mild to moderate since the pilot was still getting oxygen, even though diluted. Also, this mask deficiency would decrease the amount of pressure delivered to the lungs while at pressure breathing altitude or while using

safety pressure, since some if not all of the pressure would escape around the exhalation valve.

Meanwhile, back at the ranch—the flight surgeon requested the safety equipment officer of the squadron to permit an immediate surprise inspection of all squadron oxygen masks. He was refused (politely) on grounds that the squadron had a severe predeployment schedule to meet (which was true) and that an extensive squadron safety equipment indoctrination program was then in effect (which was also true). He did state that *three* pilots had reported mild hypoxic episodes, in the previous month, in that one squadron of 14 pilots.

The squadron commander was then requested to permit the inspection and immediately agreed.

The inspection revealed that 8 of the 14 masks had the exhalation valve completely unseated. One of the 8 belonged

to the safety equipment officer and another to the executive officer.

Furthermore, not a single pilot was able to recognize the deficiency even when told there was something wrong with his mask.

An attempt was then made to determine why the valves had become unseated. It turned out that the electronics technicians were displacing the exhalation valve while installing the mask microphones. This practice was brought to a sudden halt, needless to say. In a subsequent 8-month deployment, not a single episode of hypoxia occurred in that squadron.

Since that memorable day, the flight surgeon has kept a mask (with the exhalation valve completely unseated), on hand and has passed it around many groups of pilots and asked if anything was wrong with the mask. *Not a single pilot or flight surgeon has ever found the discrepancy, with the exception of*

one British flight surgeon who spotted it right away.

Suggested fixes for this situation have been numerous but have not as yet been approved or tested. Until such a fix is thoroughly tested and approved, why not try the following methods to prevent this situation from occurring?

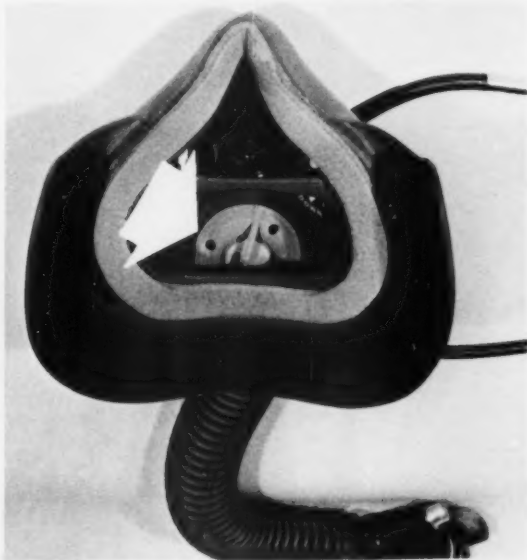
1. *Check your mask before every flight—the parachute rigger is not going to die because of a defect in your mask, but you might.*

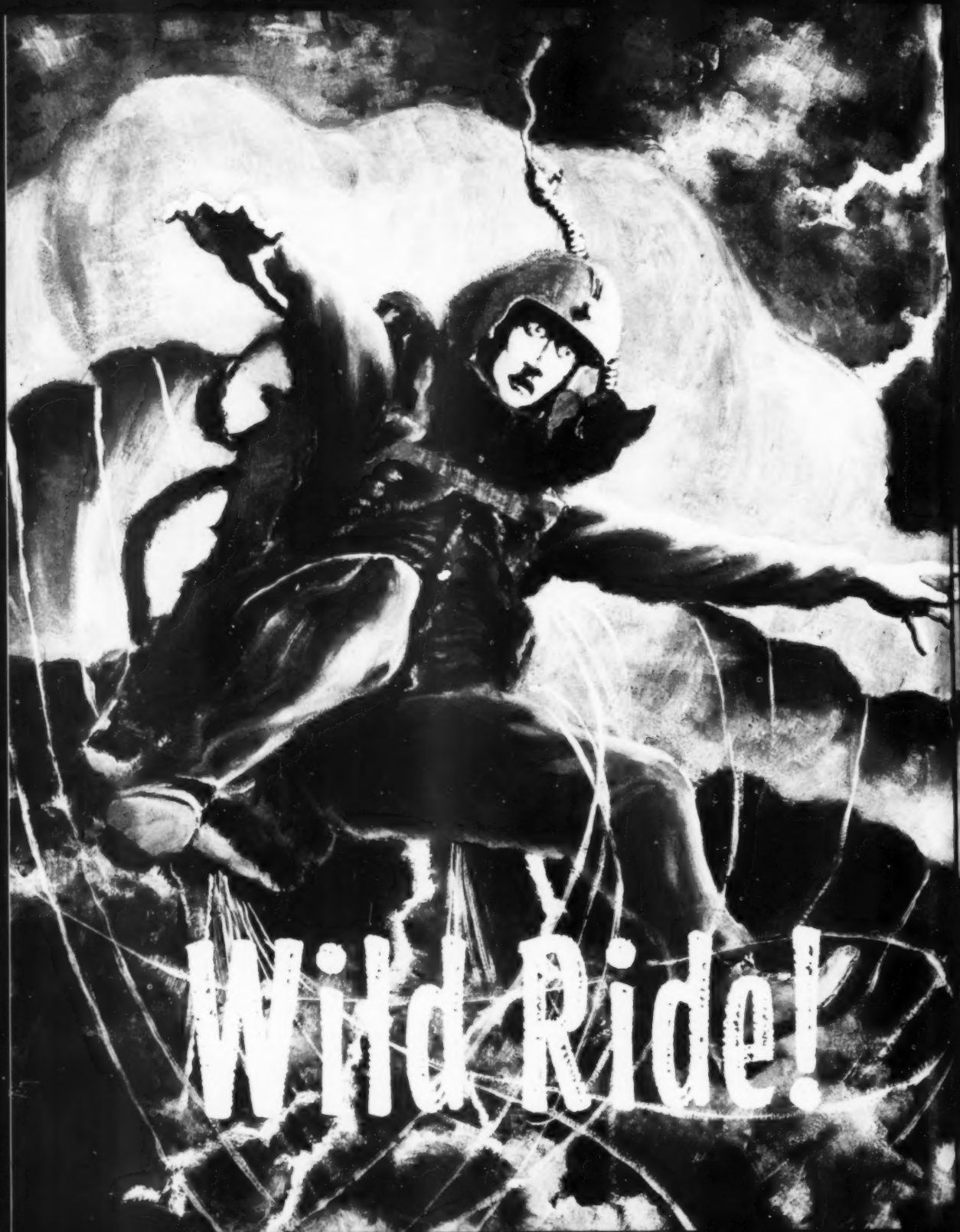
2. *Trick your flight surgeon, if you read this before he does—displace an exhalation valve and then ask him to see if anything is wrong with the mask. He'll love you for it.*


3. *Trick your pilots, if vice versa.*

4. *If there is an accident in which hypoxia is a suspected factor, try to recover the oxygen mask and check the position of the exhalation valve. It may give you the answer.* ●

Only one of these masks is correct, and safe. Which one? Dr. Ewing discusses in this article the hazards that can befall you if your exhalation valve is unseated like the one on the left.







An F8U on a two-plane VFR flight from Massachusetts to South Carolina flamed out at 47,000 feet over North Carolina.

The pilot noted engine rumble and thumps. The fire warning light came on, the pilot reduced power and the light went out; however, the RPM dropped to zero and the EGT fluctuated to a high of 800° then decreased to zero. The emergency power package was extended and the emergency generator switch placed in the ON position, with no response. Realizing that he was without radio, instruments and power controls and the stick freezing in the neutral position, the pilot decided to eject before descending in uncontrolled flight into the top of a thunderstorm. The pilot ejected directly over an extensive thunderhead estimated to have been 100 miles in diameter. The speed at the time of ejection was Mach .82 or approximately 210 knots IAS.

His dramatic 40-minute, nine-mile descent through a violent thunderstorm was widely and somewhat inaccurately covered in the nation's press. However, because of its great interest to APPROACH readers, here is a more detailed account of the pilot's experiences after ejection compiled from his statements during the accident investigation:

* * *

"MY FIRST sensation was one of severe cold and extreme expansion as if I were about to explode. The cold rapidly changed to a burning, tingling sensation. I felt as if millions of hot pins were sticking in me. I sensed that I was tumbling and spinning like a pinwheel. My arms and legs were out and I could not get them in.

"In a matter of seconds I realized I had retained my helmet and mask but no longer had my visor although I had been flying with it down because of the bright sunlight and reflection from the top of the clouds. I believe it was torn away on ejection.

"I opened my eyes and saw I was entering wispy clouds. I was going into the tops of the fleecy overcast that I had flown through just a few minutes before. I seem to remember saying to myself, 'Well, you're entering it and it's about 44,000 feet.' About this time I managed to get my arms in to my body.

"I looked down and noticed that I was absolutely forcing my torso harness. It looked like it was going to burst. My stomach popped out under my life vest as though I were pregnant.

"I had the feeling that I fell and fell and fell and fell for an eternity. My oxygen mask was beating against my face. I held my mask with my right hand. I put my left hand on my helmet which was pulling on the chin strap as if it was

going to go off. My left hand was very cold and numb—it felt like somebody else's hand, not mine.

"Sometime during the free fall, my right glove got in my way. It was inflated like a balloon so I let it go—just jettisoned it. I remember seeing it go off and I thought 'Why did I throw the glove away?'"

"During the free fall I had the feeling of not being able to exhale; in fact, I seemed to have to work very hard to be able to exhale, but all I had to do was open my mouth and in-rushing air just seemed to fill my lungs. At this time it was getting a little bit darker in the cloud.

"I had an urge to open the parachute but I told myself I was still far too high and if I did I would either freeze to death or die from lack of oxygen. I still had this tingling sensation but I sort of had the feeling that I was slowing down and falling into denser atmosphere and I seemed to be getting a little warmer.

"I was still in the free fall and thinking about opening the chute. It was quite dark but I don't recall any great moisture or any great violence. It seems like while I was thinking about opening the chute, all of a sudden there was a terrific jolt and I knew the chute had opened. I looked up but by this time I was in such a dense, dark cloud that I couldn't even see my canopy. I reached up and got hold of the risers and gave them tugs on both sides; it felt like I had a good chute.

"From here on, my memory of what happened seems much better. I now clearly recall running out of oxygen, having the mask collapse against my face, and I believe I disconnected it from the right side as I always do. At about this time I thought I definitely had it made and was going to survive. However, I noticed I was still bleeding from the nose, my right hand was cut, and my left hand was frozen numb, but the pressure was going and I was much more comfortable. Then the turbulence started and I realized I was entering the thunderstorm.

"As the turbulence started, I was pelted all over by hail. Then I fell a little bit more and I seemed to be caught in a violent up-draft. I had the feeling that I was being tossed around . . . that I was actually going around in a loop and I was looping over my canopy like being on the end of a centrifuge. I got sick in the turbulence and heaved.

"Sometimes I could see the canopy and sometimes I couldn't. The tossing and turbulence was so violent it is difficult to describe. I went up and down . . . I was buffeted about in all directions . . . at times I felt like I was going sideways. One time I hit a very rough blast of air—I went soaring back up and got in a very severe hail-storm. I remember the hail beating on my helmet.

I had the feeling it would tear my canopy up. The next thing I knew I was in rain so heavy I felt like I was standing under a waterfall. I had my mask loose and the water was so great that when I tried to inhale I got water with the air like I was swimming. It seems to me that some time in the storm I noticed my watch and was surprised that it had stayed with me. I'm not sure but I think I was able to tell the time by the luminous dial . . . I believe it was around 1815.

"At one time during an up or down draft, the parachute canopy collapsed and came down over me like a big sheet. I could see my legs in the shroudlines. This gave me some concern—I thought maybe the chute wouldn't blossom again properly and since the hail seemed to be larger now I was afraid it might damage the canopy and put holes in it. I fell and the canopy blossomed again. I felt the risers and everything seemed all right.

"At this time, I looked down and saw what appeared to be a big black elevator shaft. Then I felt like I had been hit by a blast of compressed air and I went soaring back up again—up and down—sideways. How much of this soaring went on I don't know. I had the feeling that if it went on much longer I was not going to maintain consciousness. I was being tossed around and beaten around and I wasn't quite sure how much more I could take.

"The violence was so great that I thought that if it doesn't stop soon, my gear will come apart . . . my chute will come apart . . . and my straps will break . . . I will come apart. Stretching . . . twisting . . . slamming . . . the turbulence of this thunderstorm was so violent I have nothing to compare it with. I became quite airsick and I had considerable vertigo. Again I had the feeling that I couldn't take much more of this but if I could only hold out a little while longer, I would be falling out of the roughest part of the storm.

"The lightning was so severe that I kept my eyes closed most of the time. Even with my eyelids closed, there was a blinding reddish-white light when the lightning flashed. I felt rather than heard the thunder; it just about burst my eardrums. As I recall, I had the feeling that I was in the upper part of the storm because the lightning seemed to be just flashes. As I descended, I seemed to see big streaks headed towards the earth. All of a sudden I realized that it was getting a little calmer and I was probably descending below the storm. The turbulence grew less, then ceased and I realized I was below the storm. The rain continued, the air was smooth and I started thinking about my landing.

"By now my shoulders and legs hurt pretty badly. I checked myself over again and thought

I was OK. I kept looking down and said to myself 'Under the storm you probably won't have more than 300 feet.' It was just like breaking out when you're making a GCA approach. First thing I saw was green and then I was able to see trees and then I knew I was very close to the deck.

"I remember seeing a field off in the distance and I thought there must be people nearby. As I got close to the trees I suddenly realized that there was a surface wind and I was being carried horizontally over the ground quite rapidly maybe 25 knots. I oscillated about three times, then went into the trees. It seemed that my chute fouled in two pine trees and I continued in a horizontal position with the wind, then swung back to the left. I came crashing back through the trees like a pendulum and hit a large tree with my left side. My head, face and shoulder took most of the blow. My helmet was knocked crooked but I think it did a great deal to save me here. The blow was so violent that it twisted my helmet back on the right side and pulled the chin-strap so tight over my Adam's apple under my chin that I had to loosen it when I got on the ground. Anyway I came down with a crash. I slid down and landed on my side. I was cold and stunned but still conscious. At first I thought I had broken something and was paralyzed. Pretty

soon, however, I was able to move my head and then my arms. I checked the time; it was between 1840 and 1845."

* * *

The pilot got up shakily, freed himself from his chute and started to make his way out of the woods. He panicked momentarily, then recovered. Although it was quite dim in the woods, he observed a sawed-off tree stump nearby. He looked around; there were several others. Reasoning that if men had been logging, there must be a logging road in the vicinity, he set up a square search. On the third leg, he hit the road. Following the road, he came to a clearing and a cornfield. Beyond the cornfield he saw automobile headlights. Making his way to the two-lane highway, he stood on the edge of the pavement and tried without success to wave down a car. Some 15 drivers went by without stopping.

"I must have looked like something real unusual—all wet and bleeding and standing out there in my flight suit in the dark and rain," he states. "I guess they figured I was drunk. Then after all these other cars had kept on going, a car came by and I thought I heard a boy say, 'There's a pilot, daddy.'"

The car went on down the road, turned around and came back. The pilot's ordeal was over. ●

Thunderstorm Flying

REMEMBER the old cigaret slogan, "Nature in the raw is seldom mild." A thunderstorm is nature in the rawest form. We are professional pilots, not heroes. Ever talk to a passenger that liked even being near a thunderstorm, much less in it? Avoid areas of known thunderstorm activity.

Know where your ground radar units are located and make full use of them. Don't hesitate to ask a station for Pirep or info for a radar equipped flight in the heavy storm areas.

Performing a 180 before the trouble starts is still the best way to be safe.

—ALPA Tech Talk

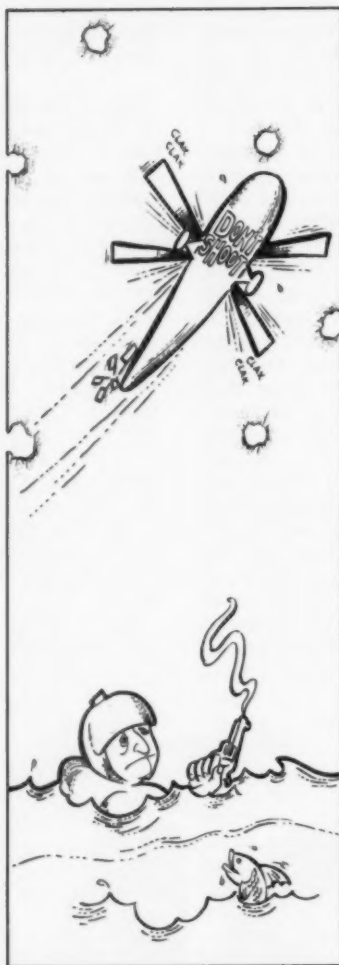
Whirly Bird Shoot

SHORTLY after the 0700 carrier launch, the pilot of an A4D had to eject because of engine failure. Once in the water, he fired two tracer bullets at an A4D circling overhead at 1500 feet, but his signals were not seen. Minutes later, a helicopter appeared. The survivor fired three tracer bullets at the helicopter. "Fortunately," the reporting flight surgeon comments, "they missed it."

Helicopters are very vulnerable to small arms fire. The gas tanks, being below the cargo deck, would be the first thing to be hit. The main rotor blades would be relatively unhurt by the bullet if hit; however, the tail rotor blade, turning at a much higher RPM, could be thrown off balance and a possible loss of directional control could occur. Tracer bullets should not be shot at the aircraft or its line of flight.

The helicopter pilot had spotted the survivor's parachute floating nearby and dye marker leaking from the packet. The survivor was rescued shortly afterward by means of the helicopter rescue seat.

Regarding the survivor's attempts at signaling, the reporting flight surgeon notes that because of the bright day, the day-smoke signal would have been more visible than the .38 tracers. (The .38 cal. tracer ammunition is a secondary means of signaling and should not be used instead of the flare.) The day-smoke signal would also have expedited the pick-up by eliminating the necessity for the helicopter pilot to drop a smoke light for wind information.



Fit to Fly

IT REMAINS impossible to regiment the life of pilots. We can teach, advise, admonish, castigate and cajole, but it remains the responsibility of the individual aviator to keep himself fit to fly.—Flight Surgeon in MOR

Accidental Inflation

A FLIGHT surgeon in a recent MOR passed along the information that several pilots in his area have reported that occasionally the actuating toggles of their life vests wedge below the lower edge of their lap belts. By moving in their seats, two of the pilots have inadvertently inflated one side of their life vests during flight.

The following "Warning" on this same subject is quoted from NavAer 00-80T-52, *Safety and Survival Equipment*, 1959 revision:

"The toggle cords should be kept free so as not to get caught in any manner that would prevent or delay inflation. Care should be taken that the toggle cords are not caught under the fastened safety belt as this may result in accidental actuation and inflation of the vest in flight."

Hypoxia Suspected

HYPOXIA is suspected in a TV-2 accident following a night cross-country flight. The pilot landed in a slip from a right-hand pattern. After porpoising three times, the aircraft continued down the runway and veered off to the right. The pilot was uninjured.

"The pilot made a habit of flying with his oxygen mask improperly fitted by choice," the flight surgeon reports. "He gives a history of never wearing his oxygen mask tight and always allowing air to escape around the bridge and sides of his nose. He would also be more susceptible to hypoxia because of the fatigue factor from only four hours' sleep the night before."

"His improper performance and part of his attitude following landing in that he allowed the aircraft to go off the runway could have been caused by hypoxia. It is emphasized that even if he did have hypoxia it was of a preventable nature and totally unnecessary."

Chow, Main Role

A FLIGHT surgeon commenting on pilot fatigue in an S2F-1 accident makes this recommendation:

"Carrier personnel who are assigned the duty of meal preparation should be informed of the importance of proper nutrition for pilots so that these personnel develop the attitude that this is a matter of great necessity and not one of convenience."

When the pilot had to ditch his aircraft, it had been nine and a half hours since he and the copilot had had a hot meal. They had box lunches in the plane but because of the relative inexperience of the copilot, the pilot had not had time to eat his.

"Actually, CVS --- was better than average in the matter of odd-hour meal preparations," the flight surgeon states, "but this is always a major problem on most ships and unnecessarily so. It appears to me that the importance of adequate nutrition is not sufficiently emphasized aboard carriers."

By the Skin of His Teeth

A CREWMAN of an AD-5N involved in a midair collision retained his life raft by what the flight surgeon describes as "remarkably good headwork."

Before the accident, the crewman's life raft lanyard was attached to the life vest D-ring. During parachute descent, he discovered that the lanyard had been broken some time during

bailout. He got hold of the lanyard and held it in his teeth.

Before entering the water, he released both the leg and chest straps of his parachute harness. Still holding the lanyard in his teeth, he pulled his life raft out and held it against his chest with both arms folded across it. As he hit the water, he slipped out of the parachute harness and surfaced, the lanyard still in his teeth. He inflated his life vest, then inflated his life raft and climbed in. Fifteen minutes later, he was rescued from the water by fishermen.

Self-Imposed Diet

RECENTLY it was reported that a pilot in a flying status had gone on a self-imposed diet without the knowledge of his flight surgeon. In an attempt to cut his weight down for his annual physical, he had lost 15 pounds in five days.

No pilot or air crewman should go on any kind of weight-reduction diet without close medical supervision.

Your flight surgeon will be

only too happy to help you lose weight, but when you put yourself on a diet without medical supervision and continue to fly, you are jeopardizing both your own safety and that of your aircraft.

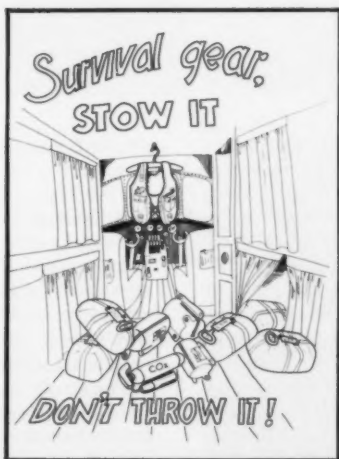
Keep It On!

WHILE on a loft bombing run, the pilot of an A4D-1 misjudged his altitude and hit the water. He climbed to 6000 feet and ejected.

Entering the water, the pilot inflated his Mk-3C life preserver, and got free of the chute. *After inflating his pararaft, he cut himself out of his torso harness suit, discarding his Mk-3C life preserver in the process. This was a serious error, one which could have jeopardized his life.*

As the rescue helicopter appeared overhead, the pilot left his pararaft and swam for the rescue sling. The sling moved around, and the pilot, unable to grasp it, started back to his pararaft. Fortunately, just at this point, he was able to grab the sling and was hoisted into the helicopter.

Survivors in a water rescue situation should never take off their flotation gear. Helicopter rescue slings and seats and helicopter hatches are designed to accommodate survivors wearing inflated life vests or Mk-3C life preservers. Without flotation gear, the survivor is in trouble if the helicopter rescue attempt is delayed or temporarily abandoned . . . if the survivor has to be lowered to the water again for some reason . . . or if the rescue helicopter has to ditch. And there is no reason whatsoever for wasting energy on removing the torso harness suit. The torso harness suit was not designed to be removed in emergencies of this type.



The prevention of aircraft incident and ground accidents should receive the same strenuous efforts as the prevention of flight aircraft accidents . . .



AN attack carrier was conducting air operations and had launched its herd of birds about two hours earlier this morning. Overhead a HUP 'copter was performing plane guard duties because no destroyers were in company. Nestled on the hangar deck was another HUP in Condition I.

The ship was still steaming along at 25 knots on a course of 240 degrees. Ceiling and sky were clear, visibility 15 miles. The relative wind was 310 degrees at 9 knots. Sea swells were kicking up from 8 to 12 feet at 12-second intervals. A slight spray occasionally blew across the elevators which were now lowered to the hangar deck level.

This is a normal situation on this carrier in all

but the calmest seas, and is caused by the lower part of the elevator structure being immersed in swells. Past experience had demonstrated that aircraft elevators could be operated under the existing conditions. Accordingly, elevators, 1, 3 and 4 were operated regularly without incident this particular morning. It was standing operating procedure to keep all elevators topside during any ship's turn. Now the ship was on a steady course.

Breaking the relative serenity at this time was the order to launch the Condition I chopper. This was to be a test of the ability of Air Department people to launch the 'copter in minimum time. The HUP was placed on the No. 1 elevator facing for-



"With a sea running on the starboard bow of the carrier and with a 25-knot ship speed the use of No. 1 elevator to bring up any kind of plane from the hangar is fraught with inherent danger . . ."



ward and secured with two tie-downs, chocked, and its tail wheel locked. Blades were spread and the order passed to start the engine. As was the practice aboard, the elevator was cleared of unnecessary personnel. A pilot and crewman were in the 'copter readying for takeoff. Two other crewmen were attending the chopper on the elevator and were preparing to take it topside.

Just before, or at the instant the order was given to raise the elevator, the ship pitched upwards and then rolled to starboard. As the bow came down No. 1 elevator dug into a swell causing a huge wave of sea water to flow over the elevator. The chopper was torn loose from its tie-downs and





Mute evidence of an over-the-side loss of an F11F together with its plane captain—some 25 feet of catwalk guard rail went with the aircraft. Life belts were recommended for crewman manning unsecured aircraft.

knocked over on its side but happened to stay on the elevator.

The two crewmen in attendance on the elevator had been washed overboard.

Life rings and smoke flares were thrown into the water near the men—wheel chocks from the overturned helicopter also marked the vicinity where the men were washed overboard. Meanwhile the "Man Overboard" word was passed and Pri-Fly radioed the plane guard copter. One of the crewmen in the water appeared to be injured. He was also the longer distance away so the pilot of the rescue copter elected to pick this man up first. The second crewman apparently uninjured was seen flailing about in the water. After three tries by the 'copter the first man was retrieved but by this time the second man disappeared under water and was seen no more.

Neither of the men washed overboard was wearing a life vest or belt. Both wore foul weather jackets. According to his service record the second man was a qualified swimmer. Observers from the ship and the helicopter stated that at no time did he appear to use any clothing as flotation equipment nor did he attempt to remove his foul weather jacket. Sharks were seen in the waters but there was no evidence of attacks by these.

The crewmembers of the helicopter which had been overturned suffered only minor lacerations and were able to evacuate the aircraft without further incident. The 'copter itself was declared a strike.

To prevent the further loss of life the accident board recommended that:

- The number of men riding deck edge elevators be kept to a minimum.
- All hands whose duties require their presence on elevators being operated at sea wear life vests.

Ed's note: A recent accident involving the loss of an F11F together with its brake rider over the side during respot operations on the flight deck brought about a similar recommendation: that the practice of wearing life vests be extended to crewmen required to man unsecured aircraft on flight decks of ships underway.

The accident board also stated that because of the unpredictable nature of the causative factors in this accident, no operationally feasible recommendations for the prevention of similar accidents can be made. However, reviewing authorities pointed out that "with a sea running on the starboard bow of the carrier and with a 25-knot ship speed the use of No. 1 elevator to bring up any kind of plane from the hangar is fraught with inherent danger," stating further "that this type of accident involving planes on elevators occurs far too often in carrier aviation.

"That the difficulties in perfect coordination between conn, pri-fly, hangar deck and flight deck control is fully realized. Nevertheless," continue the authorities, "coordination must be achieved if this type of accident is to be prevented. In addition to this coordination it is also necessary that all officers-of-the-deck and all air department officers charged with moving planes must be thoroughly trained in this part of operations. They must be aware at all times of the absolute necessity of considering all factors such as ship's turning, ship's present speed, ship's future intention, force and direction of wind and sea, whether deck and elevator are dry or wet. . . ."

It was also recommended that "a general set of guidelines be promulgated which would emphasize the necessity of considering all of the foregoing factors and the paramount necessity of coordination within the ship."

Ed's note: One of the biggest boons to coordination of flight deck operation is reported to be a transistor radio headset developed by O&R Norfolk and successfully tested aboard the carrier FORRESTAL. It permits ease of communication between flight deck officers and the Air Boss. For details please see the following page.

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CATAPULT OFFICER gets radio message originating from Pri-Fly concerning a sudden change in wind velocity before cat launch of jet. Instant transmission of this information improves both efficiency and safety of operations.



FLIGHT DECK CPO directs spotting of an F4D after receiving details from Flight Deck Officer stationed aft on FORRESTAL's more than 1000-foot flight deck.



FLIGHT DECK OFFICER in foreground stands ready to relay pilot's readiness status after flight deck recovery of F3H. This enables flight deck people to make prompt disposition of the aircraft—

AN approach to the problem of coordinating flight deck operations is this transistor radio helmet.

While this particular helmet is reported to cost about \$1000, the ability to communicate appears worth its cost in view of its contribution to flight deck efficiency and accident prevention. It is a modification of the Army AN/PRC-34 helmet radio. The compact receiver-transmitter is equipped with a boom-type, noise-filtering microphone and is battery operated.

Tests of five sets aboard FORRESTAL during actual carrier flight deck operations brought about hearty recommendations that a helmet with these capabilities be procured for all carrier usage. Its versatility is said to have applications aboard other type ships handling helicopters and for air station use as well.



SHOCK SERVICING

UPON retracting the A4D-2's landing gear after a normal takeoff, the pilot heard a chattering sound and noticed that the nose landing gear indicator remained "barber pole." The landing gear was cycled, but the nose gear remained "barber pole." As the pilot orbited to burn down to landing weight the utility hydraulic system warning light flashed ON. The landing gear was extended and indicated fully locked. The flaps would not extend and the utility hydraulic light came on steady. After an uneventful no-flap landing it was found that the nose gear telescoping link attached fitting had been pulled out, breaking the left support for the nose gear actuating cylinder completely loose.

This incident was caused by excessive hydraulic fluid in the nose gear strut due to improper service procedures. The nose landing gear strut contained proper air pressure but an excessive

amount of hydraulic fluid. During retraction of the landing gear the telescoping link could not compress the strut; hence, the force of the actuating cylinder was transmitted through the telescoping link to its attaching fitting. The attaching fitting was pulled out of the airframe. The left aft nose gear support fitting was torn completely free from its supporting bulkhead and broken at the point that the telescoping link fitting is secured.

On the previous evening, after squadron secure, a hydraulic leak was noted on the nose gear strut of the A4D-2. The duty mechanic replaced the O-ring packing Part No. MS28772343, and serviced the strut. He was not familiar with the proper procedures for servicing the strut but rather than ask or look up the proper procedures, proceeded to service the strut. In so doing, he introduced an excessive amount of hydraulic fluid into the nose gear strut assembly. Strut was then

Dry Nitrogen for Struts

On certain high performance aircraft the landing gear struts serviced with air are susceptible to low-order diesel type explosions. Hard landings, involving greater than normal compression of the gas in the strut, may raise the temperature above the auto-genous ignition temperature of hydraulic oil. Under these conditions the violence of the explosion depends on the amount of oxygen present. Perfect mixtures of atomized oil and oxygen would approach minimum dieseling pressure. Lesser amounts of oxygen would result in lower orders of pressure development, yet of a magnitude great enough in some instances to separate strut assemblies. Besides the variable amount of oxygen present in a strut, depending on the method of inflation, the aircraft gross weight and sink speed are also variables to be considered in determining shock loads necessary to cause dieseling.

The A4D, in particular, is reported to have had several low-order diesel type explosions. To alleviate this problem, the Bureau of Aeronautics (BuWeps) in letter Aer-MA-4328/8 of 5 Nov 1959 recommended that activities with the A4D use dry nitrogen for landing gear strut inflation in accordance with A4D HMI.

Because strut explosions have occurred in other model aircraft, it is suggested that all activities with the A4D use dry nitrogen with A4D HMI.

NOTE: All aircraft using high air pressures in such systems and equipment as hydraulic accumulators, pneumatic boost and emergency systems would profit by using dry nitrogen rather than air. The absence of oxygen and moisture in dry nitrogen eliminates hazards of explosions and the deterioration of housings, seals, and valves. Aircraft models which have a requirement for using dry nitrogen or dry air the instructions are clearly outlined in Handbooks of Maintenance Instructions. Included in this group are the A4D - F4D - A3D - F8U - F11F and FJ-4. Although there may be instances when nitrogen is not available for equipment servicing, generally, the supply is adequate and maintenance personnel should comply with the servicing requirements set forth in respective HMIs.

inflated to the proper extension and the aircraft placed in an "UP" status. The aircraft was not drop-checked, nor was the work inspected by a qualified quality control division inspector.

Comments and Recommendations of the Board:

1. Squadron maintenance practices should be reviewed to assure that work conducted outside normal working hours is included in the requirement for quality control inspection prior to an aircraft being placed in an up status. Additionally, the need for determining and following prescribed maintenance procedures should be emphasized to all maintenance personnel.

2. The pilot in this incident reported that the nose of the aircraft dipped normally during taxiing; however, upon application of power prior to takeoff the amount of nose dip was noticeably less than normal. A4D pilots should be advised that if this condition is encountered the aircraft should be downed for investigation.

3. Although this aircraft was landed without further damage, it is apparent that the possibility of the nose gear collapsing on landing was great. It is recommended that the manufacturer consider the desirability of redesigning the nose gear telescoping link fittings to provide a breaking point at a less critical location. The substitution of a shear bolt for either the telescoping link upper attaching bolt (Part No. 2662232) or lower attaching bolt (Part No. NAS 464-10-17), or designing a breaking point at the telescoping rod eyebolt assembly (Part No. 4447678) should provide a simple solution. In the event the nose gear strut would not compress upon retraction of the landing gear, failure at any of the above points would prevent damage to the fuselage and landing gear support structure and would allow the landing gear to be safely extended.

The commanding officer of the reporting activity concurred in the comments and recommendations of the board except as noted.

1. Maintenance procedures have been reviewed and modified to prevent further incidents of this type. Existing squadron instructions required a drop check of the landing gear whenever maintenance was performed on hydraulic actuating cylinders. These instructions have been modified to include a drop check of the landing gear following any maintenance work on the oleo strut assembly.

2. It is considered that poor pilot procedure was used in attempting to recycle the landing gear after the malfunction was noted. Pilots have been cautioned against accepting an aircraft for flight when less than a normal "nose dip" is noted either in taxi or on the preflight turnup.

COUGAR WHEEL INSTALLATION—Records indicate that seven F9Fs have been victims of maintenance errors in that either the bearing retainer clip or axle nut retainer clip was omitted during main gear wheel installation. Briefs of these follow:

F9F-8T. During taxi out of the chocks port wheel dust cover came off. Reinstalled but came off again. Pilot secured engine. Inspection revealed wheel installed without bearing retainer allowing wheel to bind against brake assembly.

F9F-8T. Starboard wheel came off as aircraft lifted off runway. Maintenance failed to install wheel axle nut retaining clip.

F9F-8T. On landing rollout starboard wheel separated from aircraft. Cause undetermined but maintenance error probable according to the report. Recommended better quality control.

F9F-8. Port wheel and brake assembly failed on landing rollout due to maintenance error. Failed to install bearing retainer.

F9F-6. Loss of wheel requiring wheels-up landing. Maintenance failed to install spring clip lock pin on wheel retaining nut.

F9F-8B. Wheels-up landing when starboard wheel was lost on takeoff. Maintenance failed to install axle nut assembly.

F9F-5. Starboard wheel wobbled and disintegrated during rollout. Clip pin left off axle nut.

All of the foregoing resulted in minor damage. It goes without saying that there is definitely a need for more emphasis on wheel installation inspection. Below is an item relative to material failure of the clip—also a source of trouble but not a factor in these incidents/accidents.

WHEEL LOSS—A recent F9F-8T accident occurred when a main landing gear wheel was lost during takeoff. Although the specific cause has not as yet been determined, the possibility exists that the retaining nut spring clip failed. While investigating this accident it was found that an old type spring clip, part no. 157602, was in use which had not been modified in accordance with BuAer letter serial Aer-AE-6323/53 of 5 March 1958. Use of the unmodified clip can result in wheel loss and squadrons operating F9F aircraft should comply with the above instructions which are reproduced below:

"An improved wheel retaining nut lock clip assembly, Bendix part no. 171343, will be incorporated in production aircraft effective with Model F9F-8T BuNo. 146342. The present lock clip as-

semblies, Bendix part nos. 157602 and 170257, will be modified by the contractor in accordance with the recommendations of this referenced message effective on BuNo. 142518 to 143012 aircraft inclusive. In all instances where the present lock clip assemblies are to be installed, it is recommended that the spring clip ends be cut off and corners rounded to be flush with the top of retaining nut after installation pending adequate stock of lock clip assembly Bendix part no. 171343.

"The Aviation Supply Office is requested to provide the improved clip assembly for spares support requirements.

"The contractor is requested to insure that this information is included in the next revision to the applicable handbooks."

TAPE WHEEL BEARING IN PLACE—Recently an F9F-8B taxied from the line area to the warm-up area with a heavy pull to the left. On arrival in the warmup area the flight leader saw metal grinding on the port wheel and instructed the pilot to shut down. When the wheel was removed it was discovered that the back bearing had not been replaced when the wheel was installed.

A troubleshooter failed to replace the back bearing when changing the port wheel. Visual inspection could not disclose the fact that the back bearing was missing.

It was determined that wheels were not inspected when picked up at the tire shop to insure completeness. Now, tape is placed over both sides of the wheel to insure that parts are not lost in transit. The safety tape is not removed until the wheel is installed on an aircraft.

WHEEL COLLAR LEFT OUT—A TF was taxiing out to the runway when a passenger reported that the starboard wheel was on fire. Crash crew alerted; fire extinguished.

Starboard wheel had been changed and at the time the wheel was reassembled, the axle collar was inadvertently left out. The wheel assembly functioned without this collar for 29 hours of flight and 32 landings, one of which was arrested, before trouble developed.

Apparently, the inner wheel bearing had ridden upon the felt washer and the snap ring until failure of the snap ring from the heat generated from friction. When breakdown occurred, pronounced distortion resulted in the integral parts of the wheel assembly. This distortion led to in-

creased friction between moving parts which ultimately resulted in the fire.

It was recommended that the axle collar (part No. 161600) be manufactured for pressfitting to axle (part No. 169662). This process would ensure against overlooking said collar upon re-assembly.

A contributing factor to this incident is the fact that although axle collar was removed in conjunction with removing the wheel of the aircraft, publications for reassembly of wheel did not include instruction for replacing same.

CONTAMINATION OF OIL—The current problem of contamination in MIL-L-7808 lubricating oil necessitated the following action by Commander Naval Air Force, Pacific Fleet, in the form of General Engine Bul. 3-60. GEB 3-60 is quoted in part for information.

"Application. All jet engines which utilize MIL-L-7808 oil.

"Action.

"a. Samples of MIL-L-7808C ASP 19887 batch 948 are known to be contaminated. This batch of oil may be used for all applicable engines when filtered through a 10 micron filter (incorporated in current pre-oilers) during delivery to the aircraft. If pre-oiling equipment is not available, batch 948 oil is satisfactory for emergency use in all applicable jet engines with the exception of the J65 engine. Since contamination exists periodically in batches of 7808 oil, it is directed that all oil delivered to J65 engines be filtered through the pre-oiler during delivery to the aircraft. It is strongly recommended that this procedure be followed for all model jet engines.

"d. Special care should be taken to insure that can opening equipment and lids are clean prior to opening cans. Oil shall not be left to stand in opened cans. Any quantity not used immediately shall be discarded."

CONTAMINATED COCKPIT AIR IN S2F—During flight the port generator of an S2F failed internally. The pilot returned to his home field for a landing. Upon lowering the landing gear burning odors and fumes were detected in the cockpit.

The reporting squadron stated the openings in the cockpit floor combined with an open nose wheel well door drafted fumes from the port engine

accessory section through the wing root and into the cockpit.

Experienced by the unit with previous generator failures indicates similar drafting action is possible with an open pilot's overhead escape hatch. For this reason the squadron has adopted the policy of keeping the overhead hatch closed during flight.

Endorsers of the report concurred in the recommendation that the feasibility of sealing the wing roots be considered. Whose move? Yours—submit your FUR.—*BuWeps must have reports to become aware of the problem, to indicate that it is not an isolated case and get a fix underway if warranted.*

DETAILED DISCREPANCIES—To further improve reliability of work performed at O&R, an Aircraft Discrepancy Report form accompanies the log books of each aircraft overhauled. This form is to be completed by the squadron and returned to the O&R where improper practices or procedures are corrected. It is important that squadrons report specific discrepancies with sufficient detail explanation in order that better service can be provided the customer.

Get into the Habit

FOREIGN object damage is a bugaboo for which all concerned with turbo-jet engines must be constantly alert.

More engines require overhaul for FOD than for any other single cause.

Reams have been written on the subject. Hours of backbreaking bending to pick up trash and more hours of sweeping have been conducted.

Campaigns have been conducted to account for all tools and hardware used in assembly.

Still foreign object damage occurs regularly.

Unfortunately, nothing new can be said on the subject. However, we can remind you to continue bending to pick up potential compressor wreckers, to continue sweeping, checking your tools, your pockets, the places where you lay nuts, bolts, washers, and other hardware.

In other words get into the habit of protecting compressor rotors from FOD in every way possible.—*Jet Service News*

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES

DATE:

TO :

FROM :

SUBJECT:

PO's - NCO's

RHIR

The mark of true ability is the capability to get any job done, not just a tougher job.

Much has been said about "R.H.I.P.," or Rank Has Its Privileges, but this latter word could also be changed to "responsibilities." As a man advances in rate, he does not leave old responsibilities behind him, he acquires new ones in addition to those he already had. And, in this sense of the word, responsibility is not an onerous burden, but a call to duty. The Navy depends upon you to answer this call.

Usually the tougher jobs go to the higher rated, or more qualified men. Over a period of time this may fall into a habit pattern whereby certain jobs are associated with certain pay grades. However, the occasion may arise when the job must be done and the first man available must accomplish it, regardless of his rate. Most Navymen accept this fact. A few feel that certain jobs are below their dignity. This is either false pride or uncertainty as to one's true ability. A man who really knows his job need not be concerned about whether or not others think he is capable.

Ability is a mark of leadership. Getting the job done does not mean that a senior should jump in and do it while juniors watch. It means that he could if it were required. It also means that he can supervise and think the job out. ●

MURPHY'S LAW*

Vice Versa Valves

When a P5M experienced frozen elevators and rudder controls, investigation revealed incorrect installation of the boost system relief valves, part nos. 20501-1 and 20373. The elevator valve was installed in the rudder relief valve position and vice versa.

The elevator control valve, part no. 40-804611-29 was also found to be incorrectly assembled. The spacer, part no. 40-8046011-13 was installed before the adjusting sleeve, part no. 40-8046011-5 instead of between the adjusting sleeve and the spacer, part no. 40-80460-11. For reference see AN 03-30ES-2, page six, figure two.

Reversed Polarity in APU

This ground accident is a prime example of "Murphy's Law." A supported squadron returned a Waukesha electrical auxiliary power unit with a broken support leg to the Fasron Aviation Maintenance Equipment Shop for repairs.

Inspection also revealed a frayed service power cable. This cable was replaced with a new one, the leg was repaired by welding, and the unit was started for a voltage check. The 30-volt full scale voltmeter indicated 28 volts.

The APU was subsequently re-issued to the squadron. Upon application of power to one of its aircraft considerable damage resulted to the electrical system of the aircraft.

Investigation revealed that the output voltage of the APU was of *reversed* polarity with a magnitude of 48 volts. (The reversed polarity voltage was the result of improper installation of the new service power cable in that the tie-point terminals had been inadvertently reversed during assembly.) Further investigation disclosed broken carbon discs in the carbon-pile voltage regulator which could have been due to shock and/or vibra-

tion. These broken discs prevented proper functioning of the voltage regulator with the resultant excessively high output voltage. The following corrective measures have been established by the reporting command:

a. The positive terminal and corresponding positive cable lead to all APUs are painted red for conspicuous identification in such a manner so as to preclude improper electrical connection.

b. A functional checker is being locally fabricated which will indicate both polarity and amplitude of APU output voltage.

This ground accident would have been prevented by line maintenance personnel had the APU voltmeter been provided with a scale with a much wider range. It is therefore recommended that:

All APUs undergoing complete overhaul at overhaul depots be equipped with an installed voltmeter with a range 50 percent in excess of the standard voltage output.

All future procurement of auxiliary electrical power units be so equipped.—Contributed by CDR W. A. KIERNAN

Cross-Connected Wires

Three cases of oil starvation in the S2F have been reported after squadron engine change as a result of cross-connected wiring to emergency oil valves. When ASC 203 is incorporated the wiring installation requires verification (figure 10 page 19). Pins F18 and F19 in main distribution box connect the right engine junction box to the right emergency engine oil valve. Pins Q11 and Q12 in main distribution box connect the left engine junction box to the left emergency engine oil valve. Prior to next periodic inspection and at each engine installation, aircraft with ASC 203 incorporated should be inspected for this discrepancy.

—CNA ResTra Note NavAer 01.56

*If an aircraft part can be installed incorrectly, someone will install it that way!

CLIPBOARD

Help Needed

THE Severe Weather Warning Center is generally concerned with forecasts for: (1) tornadoes, (2) Severe thunderstorms accompanied by wind gusts of 50 knots or more, including the direction from which the gusts are expected, (3) hail, both at the surface and aloft, (4) turbulence; (the location of areas of turbulence aloft and classification of severity are included in SWWC forecasts when applicable).

Verification of the forecasts requires months in many cases before the verification can be considered complete. In hail forecasts for example, the hailstorm normally covers a few square miles, while weather stations are many miles apart, especially in the region where most hail occurs. Thus it has been necessary to rely primarily on weather bureau climatological summaries and newspaper accounts for most verifications.

Pilots can materially aid the verification program and the state of the art by forwarding accounts of severe thunderstorms, hail and thunderstorm winds, . . . to the Center.

Mail to: Officer in Charge, USAF Severe Weather Warning Center, Room 704, Federal Office Building 9th and Walnut, Kansas City, Missouri.

Detouring Thunderstorms

INSO FAR as possible, the following info should be furnished ATC when requesting clearance to detour around T-storm activity:

1. Proposed point at which detour will begin.
2. Proposed route and extent of



. . . light rain in JAX . . . yes . . . IFR to Norfolk . . . right . . . ceiling 200 . . .

detour (direction and distance).

3. Altitude or altitudes.
4. Point and estimated time where original route will be resumed.
5. Flight conditions (IFR/VFR).
6. Any further deviation that may become necessary as flight progresses.
7. Advise if aircraft has functioning airborne radar.

As the FAA suggests, when flying within the Continental Control Area, the proposed detour should be defined by appropriate navigational aids (though not necessarily directly over or between such aids). When this is not possible and traffic exists at the desired altitude, ATC will be unable to approve the detour. In such cases ATC may offer a clearance via the detour route in a different altitude. When an alternate altitude is not available, the pilot may elect to detour under his emergency authority.

P.S. Procedures for radar assists in vectoring around severe weather conditions by Air Defense facilities are still current.

Thunderstorm Flying

►The most turbulent area is usually throughout about the middle third of the vertical cloud structure.

►Hail is most likely to be encountered at or near the freezing level. It is at this point where the hailstones are largest.

►The most and heaviest icing is experienced in conjunction with air temperatures of about 0° to -10° C.

►Most static-electric discharges occur near the freezing level.

Recommendations:

►Avoid flight in thunderstorm activity where possible. Circumnavigation at high levels is preferable if the height of the tops permit.

►If high-level circumnavigation is not possible, the second best is low-level flight at 10,000 feet or below, and below the bases if terrain clearance is adequate.

►Avoid flight at or near the freezing level.

►Slow the aircraft to best penetration speed as prescribed in your operations manuals.—TWA "Flite Facts"

Advance Instrument Approach Info

THE FAA has established a procedure which will provide the pilot with advance notification of the type of instrument approach he may expect to conduct at destination. This notification will be furnished to the pilot by the approach control facility on initial contact or as soon thereafter as possible at airports where several types of approach procedures are available.—TWA Flite Facts

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You want to fill one out? Sure—just leave it here and I'll mail it for you ... Me, I'm Beverly ...



JET-ASSISTED JET

Even a jet occasionally needs a jet assist. But no matter how much assist you get, be it from JATO bottles or a kettlefull of steam, it's still only an assist. The "Prime mover" is still in the seat, stick and throttle in hand. Your takeoff is governed and affected by many variables—some cancel out, others compound. And the only computer capable of integrating the varying variables for you—and translating stimulus into action—is nestled snugly inside your hardhat. All the assists in the world can't make your takeoff for you if you're not at least one notch ahead of the train of events. Plan and make every takeoff as though your life depended on it... because it does.

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